THE American JOURNAL OF Surgery

NOVEMBER 1955

THURSTON SCOTT WELTON, M. D., EDITOR

Papers of the
American Proctologic Society

SIXTY-FOURTH YEAR OF PUBLICATION

NOVEMBER 1955

THE American JOURNAL OF Surgery

Editor THURSTON SCOTT WELTON, *New York*
Associate Editors BRADLEY L. COLEY, *New York* · ARNOLD S. JACKSON, *Madison*
E. ERIC LARSON, *Los Angeles*

ADVISORY BOARD

LYON H. APPLEBY, *Vancouver*
CLAUDE S. BECK, *Cleveland*
H. GLENN BELL, *San Francisco*
CLARENCE J. BERNE, *Los Angeles*
B. MARDEN BLACK, *Rochester, Minn.*
GEORGE R. BRIGHTON, *New York*
MEREDITH F. CAMPBELL, *Miami*
JAMES T. CASE, *Santa Barbara*
DWIGHT E. CLARK, *Chicago*
RANDOLPH LEE CLARK, JR., *Houston*
ISIDORE COHN, *New Orleans*
FREDERICK A. COLLER, *Ann Arbor*
PAUL C. COLONNA, *Philadelphia*
GORDON S. FAHRNI, *Vancouver*
EGBERT H. FELL, *Chicago*
HERBERT C. FETT, *Brooklyn*
EMIL GOETSCH, *Brooklyn*
CHARLES A. GORDON, *Brooklyn*
DONALD GUTHRIE, *Sayre, Pa.*
Detroit, LOUIS J. HIRSCHMAN
San Francisco, EMILE F. HOLMAN
Kansas City, Mo., CLAUDE J. HUNT
New York, THOMAS J. KIRWIN
Chicago, WALTER G. MADDOCK
New Orleans, RUDOLPH MATAS
St. Louis, CARL A. MOYER
Toronto, D. W. GORDON MURRAY
San Francisco, H. C. NAFFZIGER
Baltimore, EMIL NOVAK
Christmas Cove, Me., CLARENCE R. O'CROWLEY
New Orleans, NEAL OWENS
San Francisco, VICTOR RICHARDS
Raleigh, HUBERT A. ROYSTER
Philadelphia, HENRY S. RUTH
Memphis, ROBERT L. SANDERS
Baltimore, GRANT E. WARD

improve results in biliary tract surgery

3-DAY BILIARY FLUSH*

preoperatively "...a useful program...to purge the bile duct of debris by physiologic means."[1]

"...to wash existing liver stones down...where they will be accessible at the first operation."[1]

and in choledocholithiasis, "...advised...before resorting to surgery...."[2] if complete obstruction is not present.

postoperatively "...aids in removal of inspissated material and combats infection...[by] true hydrocholeresis—a marked increase both in volume and fluidity of the bile."[3]

"...when choledochostomy has not been done, the three-day flush regimen is recommended to follow every cholecystectomy."[4]

"...remaining common duct stones have been successfully dislodged in at least 80% of the cases."[4]

DECHOLIN®

with Belladonna

(dehydrocholic acid and belladonna, *Ames*)

"therapeutic bile"* PLUS *spasmolysis

Each tablet of *Decholin*/Belladonna contains *Decholin* 3¾ gr., and extract of belladonna ⅛ gr. (equivalent to tincture of belladonna, 7 minims).

References: (1) Rosser, J. H., and McCall, R. A.: U.S. Armed Forces M. J. *5*:658, 1954. (2) Kantor, J. L., and Kasich, A. M.: Handbook of Digestive Diseases, ed. 2, St. Louis, The C. V. Mosby Company, 1949, p. 502. (3) Schwimmer, D.; Boyd, L. J., and Rubin, S. H.: Bull. New York M. Coll. *16*:102, 1953. (4) Best, R. R.; Rasmussen, J. A., and Wilson, C. E.: A.M.A. Arch. Surg. *67*:839, 1953.

Complete information on the Three-Day Biliary Flush available from your Ames Professional Service Representative — or write to Medical Service Department.

AMES
COMPANY, INC • ELKHART, INDIANA
Ames Company of Canada, Ltd., Toronto

63855

Is your postoperative infection rate as low as this?

1.2 per cent infections among 6242 cases.[1]
0.9 per cent infections among 561 cases.[2]
0.6 per cent infections among 1211 cases.[1]
0.7 per cent infections among 296 cases.[1]

These results were obtained when pHisoHex was used routinely as a surgical "pre-op" hand scrub. No other scrub or wash has a *proved* record of clinical results in thousands of cases. pHisoHex is superior to all other scrubbing agents.[3-12]

pHisoHex®
(pHisoderm® plus 3% hexachlorophene)

Winthrop-Stearns INC.
New York 18, N. Y. • Windsor, Ont.

References: **1.** Bowers, R. F., in discussion of Price, P. B.: *Ann. Surg.*, 134:476, Sept., 1951. **2.** Freeman, B. S.; and Young, T. K., Jr.: *Arch. Surg.*, 61:1145, Dec., 1950. **3.** Hopper, S. H.: *Bull. Am. Soc. Hosp. Pharmacists*, 10:202, May-June, 1953. **4.** Hopper, S. H.; Beck, A. V. R.; and Wood, K. M.: *Bull. Am. Soc. Hosp. Pharmacists*, 10:199, May-June, 1953. **5.** Zintel, H. A.; Ellis, Helen; and Garcia, Martha: Paper read at the Clinical Congress of American College of Surgeons, Chicago, Ill., Oct. 5-9, 1953. **6.** Cleland, Hugh: *Canad. Med. Assn. Jour.*, 66:462, May, 1952. **7.** Harrison, Elliott; and Cockcroft, W. H.: *Canad. Med. Assn. Jour.*, 66:110, Feb., 1952. **8.** Shay, D. E.: *Oral Surg., Oral Med. & Oral Path.*, 4:355, Mar., 1951. **9.** Dennis, E. W.: Unpublished data in the files of Sterling-Winthrop Research Institute. **10.** Dull, J. A.; Zintel, H. A.; Ellis, H. L.; and Nichols, A.: *Surg., Gynec. & Obst.*, 91:100, July, 1950. **11.** Allers, Olga E.; Hubbell, J. P., Jr.; and Buck, Ann S.: *Am. Jour. Obst. & Gynec.*, 60:431, Aug., 1950. **12.** Canzonetti, A. J.; and Dalley, M. M.: *Ann. Surg.*, 135:228, Feb., 1952.

The American Journal of Surgery

CONTENTS–November 1955

VOLUME NINETY NUMBER FIVE

PRESIDENTIAL ADDRESS

Physician First—Specialist Second 699
A. W. MARTIN MARINO

ORIGINAL ARTICLES

Metastatic Cancer of the Liver. The Clinical Problem and Its Management 704
GEORGE T. PACK AND RICHARD D. BRASFIELD

Morbidity and Mortality Factors in Large Bowel Obstruction 717
LOUIS R. SLATTERY AND PETER J. FERRATO

Correction of Rectal Incontinence. Transplantation of the Gracilis Muscle to Construct a Rectal Sphincter 721
KENNETH PICKRELL, NICHOLAS GEORGIADE, CARTER MAGUIRE AND HUGH CRAWFORD

Epidermoid Carcinoma of the Anal Region. Inguinal Metastases 727
MAUS W. STEARNS, JR.

Use of Pedicle Skin Grafts in Anorectal Surgery . 734
E. L. FITZSIMMONS

Anorectal Complications in Leukemia 738
W. A. BLANK

Contents Continued on Page 5

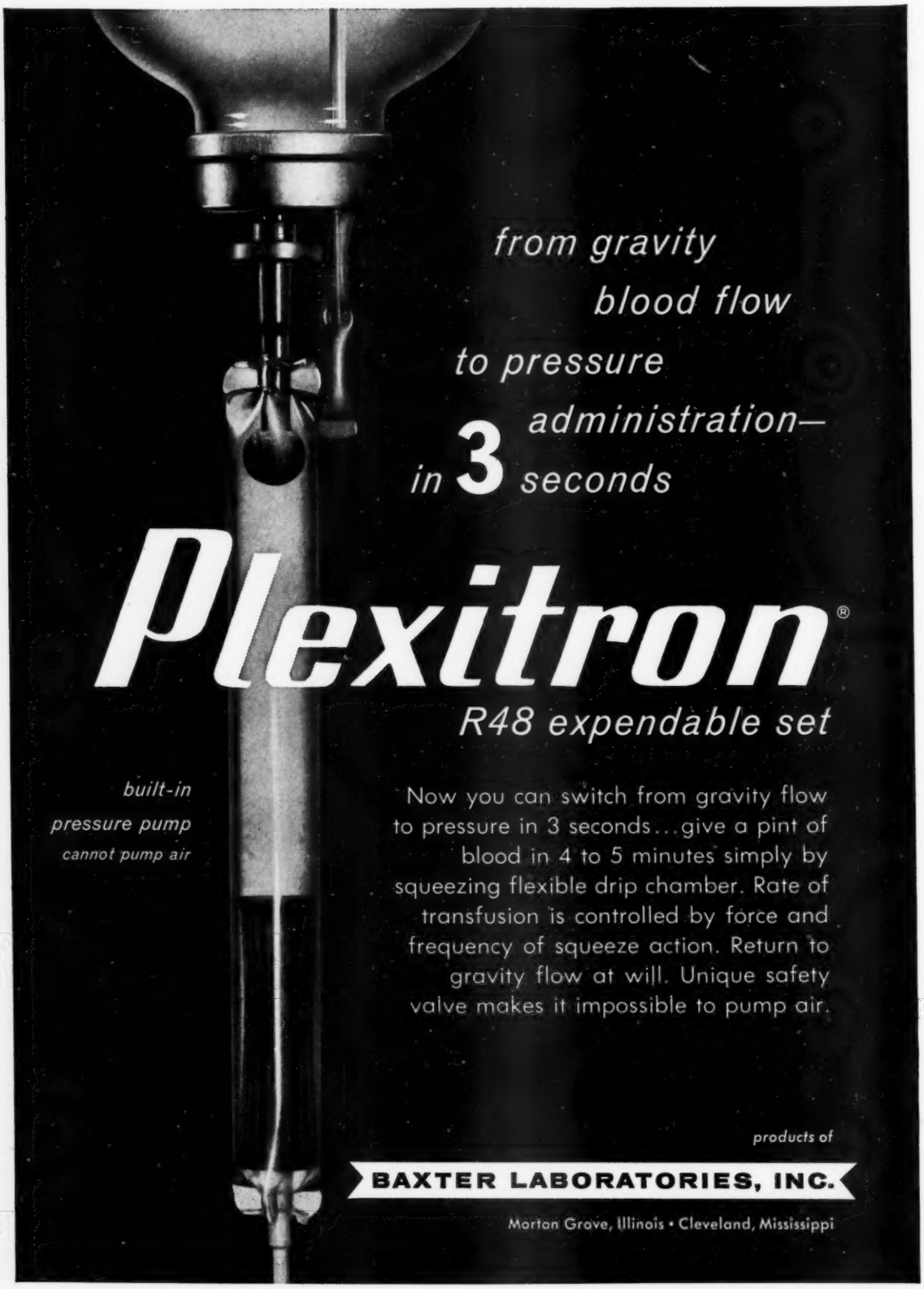
The American Journal of Surgery is published monthly by The American Journal of Surgery, Inc., 49 West 45th Street, New York 36, N. Y. Yearly Subscription, $15.00 U. S. A.; $16.00 Canada; $17.00 Foreign including Pan-American Countries. Single Numbers $2.00; Special and Symposia Numbers $4.00. Reentered as second class matter February 7, 1951, at the Post Office, New York, N. Y., and on February 7, 1951, at York, Pa., under the Act of March 3, 1879. November, 1955—New Series, Volume 90, No. 5. *Copyright©, 1955, by The American Journal of Surgery, Inc.*

MANUSCRIPTS: All manuscripts should be addressed to the Editorial Office of the Journal, 49 West 45th Street, New York 36, N. Y.

Change of address must reach us one month preceding month of issue.

ADVERTISING REPRESENTATIVES

New York: P. A. Porter, P. D. Brewer, H. D. Robinson—JUdson 2-3090
Chicago: R. H. Andrew—FRanklin 2-3861
Pasadena: Ren Averill—RYan 1-9291


from gravity
blood flow
to pressure
administration—
in 3 seconds
Plexitron®
R48 expendable set
built-in
pressure pump
cannot pump air
Now you can switch from gravity flow to pressure in 3 seconds...give a pint of blood in 4 to 5 minutes simply by squeezing flexible drip chamber. Rate of transfusion is controlled by force and frequency of squeeze action. Return to gravity flow at will. Unique safety valve makes it impossible to pump air.
products of
BAXTER LABORATORIES, INC.
Morton Grove, Illinois • Cleveland, Mississippi

DISTRIBUTED AND AVAILABLE ONLY IN THE 37 STATES EAST OF THE ROCKIES (except in the city of El Paso, Texas) THROUGH

AMERICAN HOSPITAL SUPPLY CORPORATION

SCIENTIFIC PRODUCTS DIVISION GENERAL OFFICES • EVANSTON, ILLINOIS

CONTENTS continued–November 1955

VOLUME NINETY NUMBER FIVE

Construction of Pouch Using "Pantaloon" Technic for Pull-through of Ileum Following Total Colectomy. Report of Experimental Work and Results . 742
MIGUEL A. VALIENTE AND HARRY E. BACON

Polyposis of the Large Intestine: Preservation of the Terminal Segment 751
WILLIAM G. SMITH AND RAYMOND J. JACKMAN

Minimization of Risk and Disability in Idiopathic Ulcerative Colitis 761
CLARENCE DENNIS AND KARL E. KARLSON

Anorectoplasty for Hemorrhoidal Surgery . . . 767
ARTHUR E. LEWIS

"Without Fear and Without Reproach". 773
LOUIS A. BUIE

Significance of Epilation As an Adjunct in the Treatment of Pilonidal Sinus Disease 775
NEIL W. SWINTON AND ROBERT E. WISE

Abdominal Proctopexy and Primary Sigmoid Resection for Rectal Procidentia 780
HOWARD M. FRYKMAN

Autonomic Nervous System in Pruritus Ani. Perianal Skin Temperatures after Sympathetic Block in Control Subjects 790
CALEB SMITH, GEORGE M. MALKIEWICZ AND GEORGE Y. MASSENBERG, JR.

The Challenge of the Colorectal Adenomatous Polyp 795
ALEXANDER E. ROSENBERG

Barium Granuloma of the Rectum Following Barium Enema. Case Report 802
LYLE W. SWARTZ

Dermatologic Concepts and Management of Pruritus Ani 805
JOHN L. FROMER

Management of Primary Carcinoma of the Rectum Diagnosed during Pregnancy 816
D. W. McLEAN, T. C. ARMINSKI AND G. T. BRADLEY

Contents Continued on Page 7

IN SHOCK THERAPY

Albumin/CUTTER

IN SHOCK THERAPY following trauma, hemorrhage or burns, Albumin maintains osmotic pressure in the blood. The injection of concentrated Albumin results in a greater increase in plasma volume than can be accounted for by the volume of solution injected. An intravenous infusion of 50 cc. of 25% Albumin may be expected to pull 175 cc. of fluid (3½ times its volume) into the circulatory system *within 15 minutes.* It would require 250 cc. of plasma to obtain the same therapeutic effect.

And Albumin/Cutter

- is heat treated against hepatitis virus
- is liquid, salt-poor, ready for immediate use
- requires no typing, grouping or cross-matching of blood before using
- is available in 50 cc. kits (complete with administration set) and in 20 cc. vials

The fast-acting, hepatitis-free human blood fraction

Albumin/ SINCE CUTTER 1897

5 other reasons to be sure Albumin/Cutter is readily available:

CUTTER Laboratories
BERKELEY, CALIFORNIA

Cirrhosis · Cerebral Edema · Burns · Nephrotic Syndrome · Hypoproteinemia

CONTENTS continued–November 1955

VOLUME NINETY NUMBER FIVE

Management of Proctologic Disease in Pregnant and Parous Women 826
MARK M. MARKS AND GEORGE H. THIELE

SYMPOSIUM ON THE EARLY DIAGNOSIS OF TUMORS OF THE RECTUM AND COLON

Evaluation of Polyps Detected in 20,847 Routine Sigmoidoscopic Examinations 834
G. S. WILSON, E. H. DALE AND O. A. BRINES

Exfoliative Cytology in Tumors of the Rectum and Colon. A New Abrasive Balloon 841
CLARENCE C. FULLER

Colotomy and Coloscopy in the Management of Mucosal Polyps and Cancer of the Colon . . . 846
MICHAEL R. DEDDISH AND RALPH E. HERTZ

Roentgenologic Examination of the Rectum and Colon 850
ROBERT E. WISE

PAPERS READ BY TITLE

Anal Fissure and Associated Pathologic Conditions in Infancy and Early Childhood 860
EDWARD F. SLADEK

Anorectal Fistula 863
GORDON BUNNEY

Collective Review of Endometriosis of the Colon . 866
GUY L. KRATZER AND EUGENE P. SALVATI

Premalignant Lesions of the Colon 870
DAUGH W. SMITH

Villous Tumors of the Rectum. 873
NORMAN L. FREUND

PANEL DISCUSSION

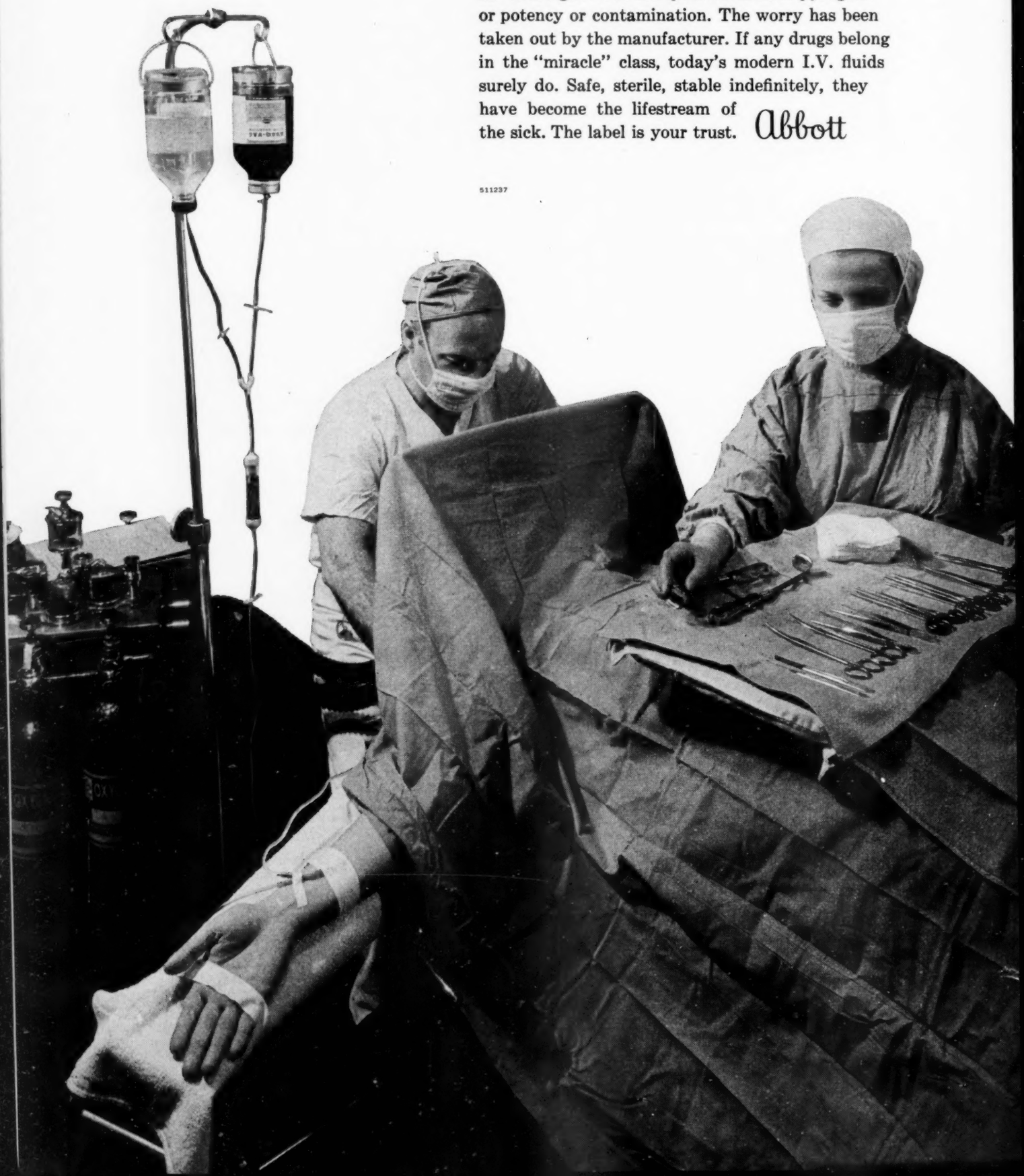
Residency Training in Proctology. 877

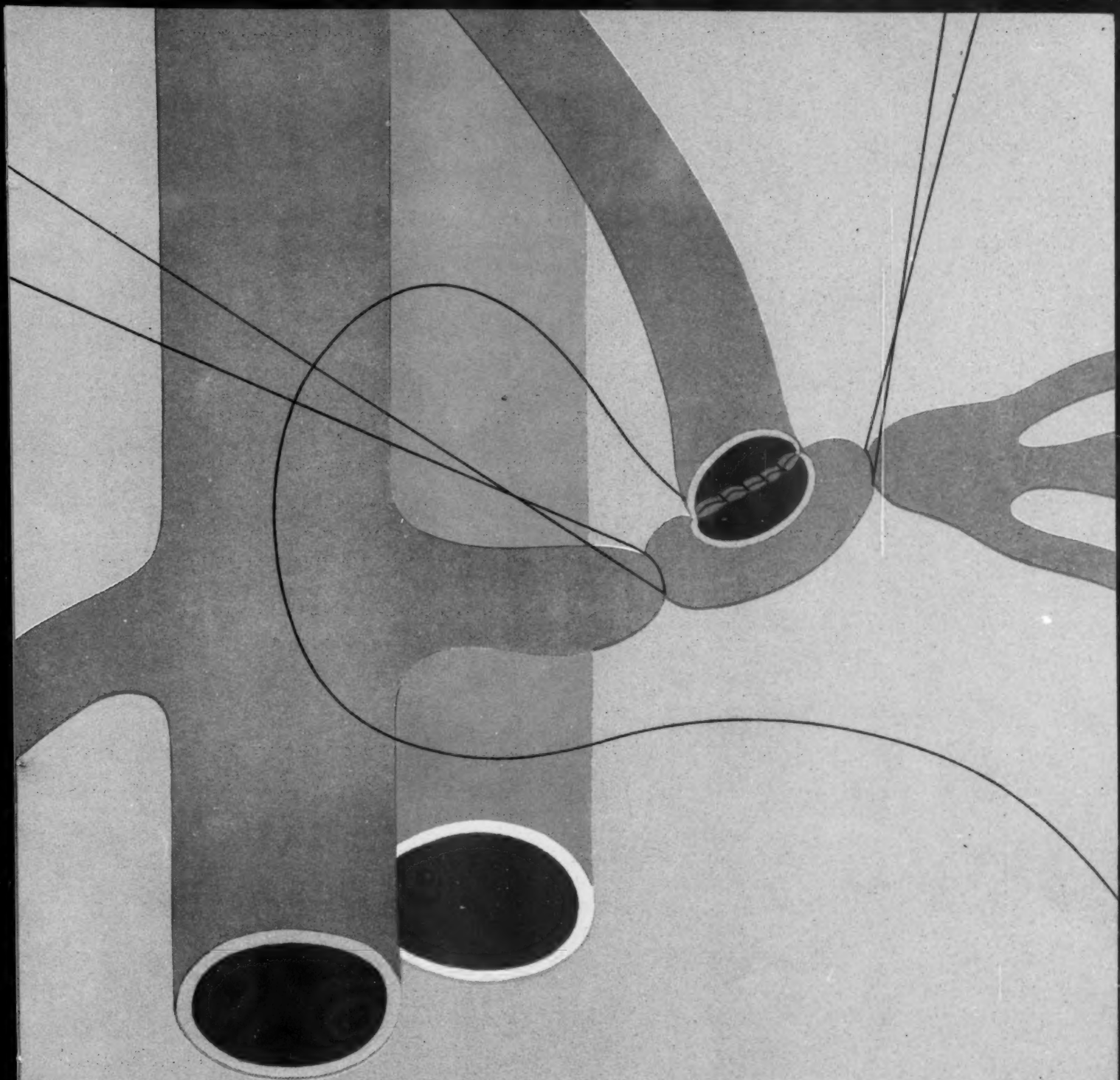
NOTES AND QUOTES (Advertising Section) . . 54

the patient will live

He'll live because today's surgical team make no mistakes. They know their tools, and their tools are almost perfect. He'll live because today's medicine is better. And safer. Like the fluids feeding down into his vein right now. No question here of pyrogens or potency or contamination. The worry has been taken out by the manufacturer. If any drugs belong in the "miracle" class, today's modern I.V. fluids surely do. Safe, sterile, stable indefinitely, they have become the lifestream of the sick. The label is your trust. Abbott

511237

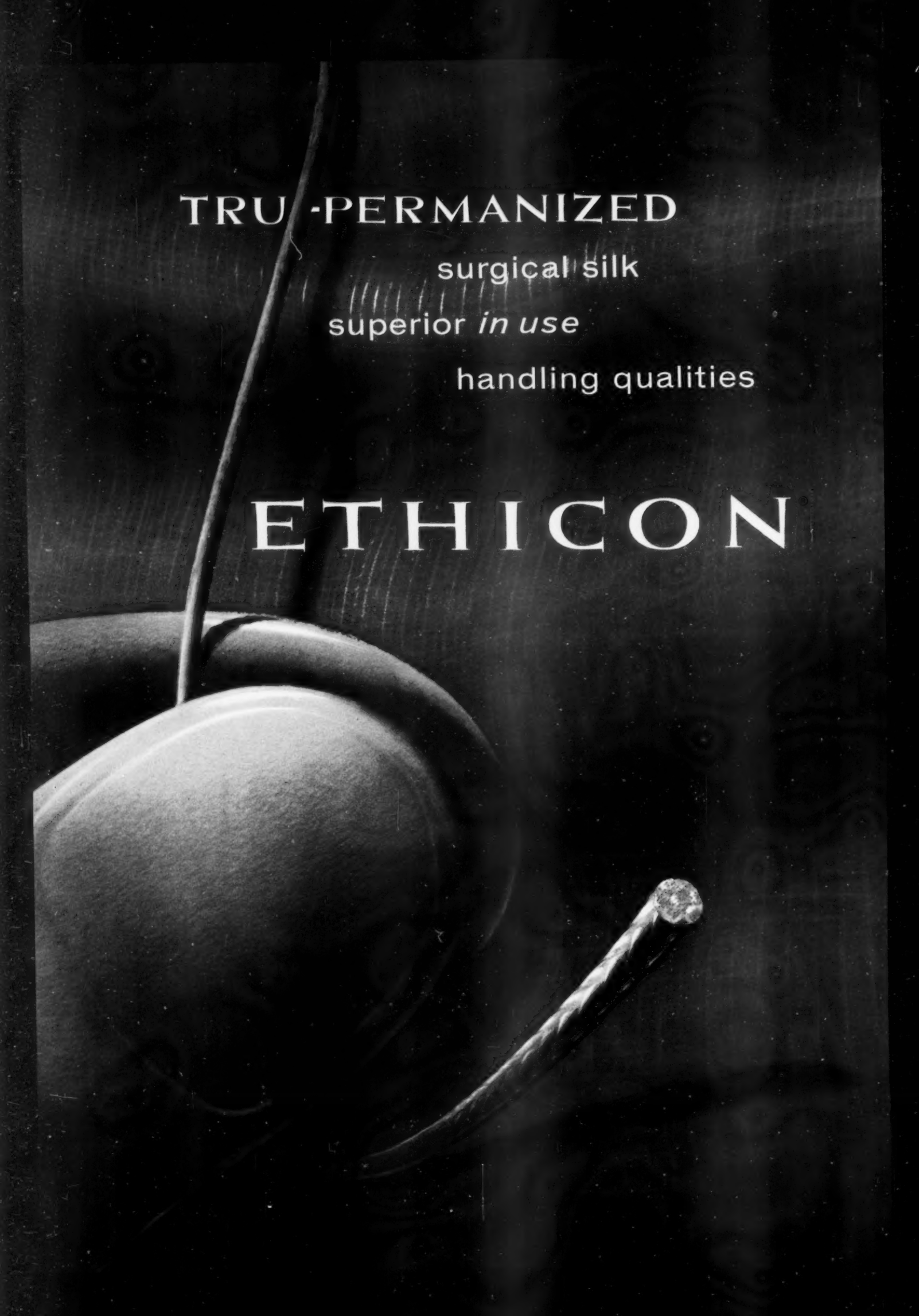


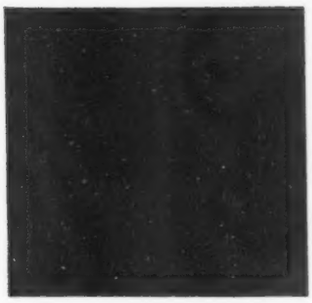


setting new standards

ETHICON®

sutures


TRU-PERMANIZED
surgical silk
superior *in use*
handling qualities
ETHICON



WANTED: Fracture Cases to demonstrate the superior quality of "Gypsona" Plaster of Paris Bandages.

From finger casts to spinal jackets "Gypsona" casts are significantly superior in ease of molding • cleanliness with a porcelain-like finish • strength coupled with lightness • economy in use.

Just the right amount of a unique gypsum has been uniformly and finely impregnated by a special process into a specially woven cloth with non-fraying edges. This has ensured the superior performance of "Gypsona" bandages, the choice of leading physicians in many countries of the globe.

"Gypsona" Plaster of Paris Bandages are now available in all 48 states through Surgical Supply Dealers. They are made in a wide variety of sizes to fit your every need.

The Hallmark of Quality

Gypsona*

Plaster of Paris Bandages

S&N **SMITH & NEPHEW, Inc., 137 East 25th Street, New York 10, N.Y.**

*Reg. Trade Mark of T J. Smith & Nephew, Ltd., England

A Laboratory and Clinical Report on Adrenosem® Salicylate

(BRAND OF CARBAZOCHROME SALICYLATE)

History

The first investigation of a hemostat with an action comparable to Adrenosem Salicylate was made by Derouaux and Roskam[1] in 1937. They reported that an oxidation product of adrenalin, adrenochrome (which has no sympathomimetic properties), has prompt hemostatic activity.

It was further found that various combinations of adrenochrome, notably the oxime and semicarbazone, produced stable solutions. But, these were so slightly soluble that sufficient concentration could not be obtained for practical therapeutic use. By combining these adrenochrome compounds in a sodium salicylate complex a stable, soluble form can be obtained. This complex has been given the generic name, carbazochrome salicylate, and is supplied under the trade name Adrenosem Salicylate.

Roskam, in his study entitled "The Arrest of Bleeding,"[2] enumerates "the drugs whose efficaciousness as hemostatics have been proved by accurate methods in experimental animals and in healthy men as well. . . . One is the monosemicarbazone of adrenochrome [Adrenosem Salicylate]."

Chemistry

Adrenosem Salicylate is a synthetic chemical. The full chemical name is adrenochrome monosemicarbazone sodium salicylate complex.

Pharmacology

Although it is chemically related to epinephrine, Adrenosem Salicylate has no sympathomimetic effects. It does not alter blood components, nor does it affect blood pressure or cardiac rate.[2-7]

(* U.S. Patent 2,581,850)

Sherber, in an early study,[3] concludes that Adrenosem Salicylate* "is a potent antihemorrhagic factor in those conditions in which the integrity of the smaller vessels is interrupted, and is superior to any similar material that is now available."

He continues, "From our experience it appears that adrenochromazone complex is indicated in preventing vascular accidents incident to hypertension; in maintaining small vessel integrity; in the preoperative preparation where oozing from a vascular bed is anticipated, as in tonsillectomies, adenoidectomies and prostatectomies; and as an adjunct in the treatment of bleeding from such surgical procedures."

Adrenosem Salicylate may be administered simultaneously (but separately) with any type of anesthetic, anticoagulant, or vitamin K and heparin.

A Unique Systemic Hemostat

Clinical investigators[2-7] are in agreement that Adrenosem Salicylate controls bleeding and oozing by decreasing capillary permeability and by promoting the retraction of severed capillary ends. It aids in maintaining normal capillary integrity by direct action on the intercellular "cement" in capillary walls. The interesting work of Fulton[8] confirms this. Adrenosem Salicylate, since it is not a vasoconstrictor, has no effect on large severed blood vessels and arterioles.

Adrenosem Salicylate is being used both prophylactically and therapeutically in thousands of hospitals, and in virtually every type of surgical procedure. It has also proved most useful in dental surgery.[7]

Owings reported on the use of Adrenosem Salicylate in controlling postoperative adenoid bleeding in 102 cases.[4] "We have used 2½ mg.

(½ ampule) intramuscularly, 15 minutes before anesthesia for children and 5 mg. (1 ampule) for adults." In only one patient did bleeding occur. Three others showed red blood from the nose and mouth. These patients "were then given 5 mg. intramuscularly, with prompt and complete control. We have also noticed that bleeding stopped more promptly on the operating table."

This is a 1% incidence of postoperative bleeding using Adrenosem Salicylate preoperatively, compared to an incidence of 10% postoperative bleeding in all cases taken from previous records, without Adrenosem Salicylate medication.

Peele reports on the use of Adrenosem Salicylate in treating 178 patients with 24 different conditions.[5] The drug was first used to control postoperative hemorrhage from the adenoid region. He adds: "The results were so dramatic that since that date [1953] Adrenosem Salicylate has been used postoperatively to reduce bleeding from all otolaryngologic and bronchoesophagolic procedures, to treat postoperative hemorrhage from the tonsil and adenoid regions, and to treat selected cases of epistaxis."

The effectiveness of Adrenosem Salicylate in controlling bleeding and oozing in 330 patients is reviewed by Bacala.[6] "Our experience of the effect of carbazochrome salicylate on 317 surgical indications and 13 obstetricogynecological conditions, has been therapeutically encouraging and successful for the control of capillary bleeding. Foremost among the cases studied were 223 tonsillectomies definitely benefited by this metabolic hemostat, making a diminution of the control incidence of posttonsillectomy bleeding of 19.8% down to 7%. It has also been found useful in gastro-intestinal bleeding, cataract extraction, epistaxis, incisional seepage, trans-urethral prostatectomy, menometrorrhagias, cervical ooze, antepartum and postpartum bleeding, threatened abortion, and prevention of capillary hemorrhages during hedulin or dicumerol therapy."

Side Effects

All investigators concur that, at recommended dosage levels, Adrenosem Salicylate is free from toxic effects. No cumulative effects attributable to the drug have been reported.

The only side reaction noted has been a transient stinging sensation in the area of injection when Adrenosem Salicylate is used intramuscularly. As one investigator comments: "The brief discomfort which attends the injection of Adrenosem into the gluteal region has not been a significant problem in children or adults as originally anticipated."[5]

Indications

Idiopathic purpura, retinal hemorrhage, familial telangiectasia, epistaxis, hemoptysis, hematuria.

Postoperative bleeding associated with:
tonsillectomy, adenoidectomy and nasopharynx surgery;
prostatic and bladder surgery;
uterine bleeding;
postpartum hemorrhage;
dental surgery;
chest surgery and chronic pulmonary bleeding.

Dosage

For recommended dosage schedules, please send for detailed literature.

Supplied

Ampuls: 5 mg., 1 cc. (package of 5).
Tablets: 1 mg. S.C. Orange, bottles of 50.
Tablets: 2.5 mg. S.C. Yellow, bottles of 50.
Syrup: 2.5 mg. per 5 cc. (1 tsp.), 4 ounce bottles.

References

1. Roskam, J. and Derouaux, G.: Arch. of Intern. Pharmacodynamie **71**:389 (1945).
2. Roskam, J.: Arrest of Bleeding, Charles C. Thomas, Springfield, Ill. 1954.
3. Sherber, Daniel A.: The Control of Bleeding, Am. J. Surg. **86**:331 (1953).
4. Owings, Capers B.: The Control of Postoperative Bleeding with Adrenosem, Laryngoscope, **55**:21 (Jan., 1955).
5. Peele, J.C.: Adrenosem in the Control of Hemorrhage from the Nose and Throat, A.M.A. Arch. of Otolaryng. **61**:450 (April, 1955).
6. Bacala, J.C.: The Use of the Metabolic Hemostat, Adrenosem Salicylate. To be published.
7. Riddle, A.C. Jr.: Adrenosem Salicylate: A Systemic Hemostat, Oral Surg., Oral Med., Oral Path. **6**:617 (June, 1955).
8. Fulton, M.D., Dept. of Biology, Boston University: Personal Communication.

THE S. E. MASSENGILL COMPANY • BRISTOL, TENNESSEE
NEW YORK KANSAS CITY SAN FRANCISCO

THIS IS

Rauwiloid®

The original alseroxylon fraction of India-grown Rauwolfia serpentina, Benth.

All the hypotensive alkaloids of Rauwolfia—not merely a single isolated substance

Free from the dross of the whole root

Gently antihypertensive

Tranquilizing

Bradycrotic

Free from undesirable side actions

Single daily dose

DOSAGE: Merely two 2 mg. tablets at bedtime. After full effect 1 tablet usually suffices. Available in bottles of 60, an average month's supply.

FIRST THOUGHT IN HYPERTENSION

Riker

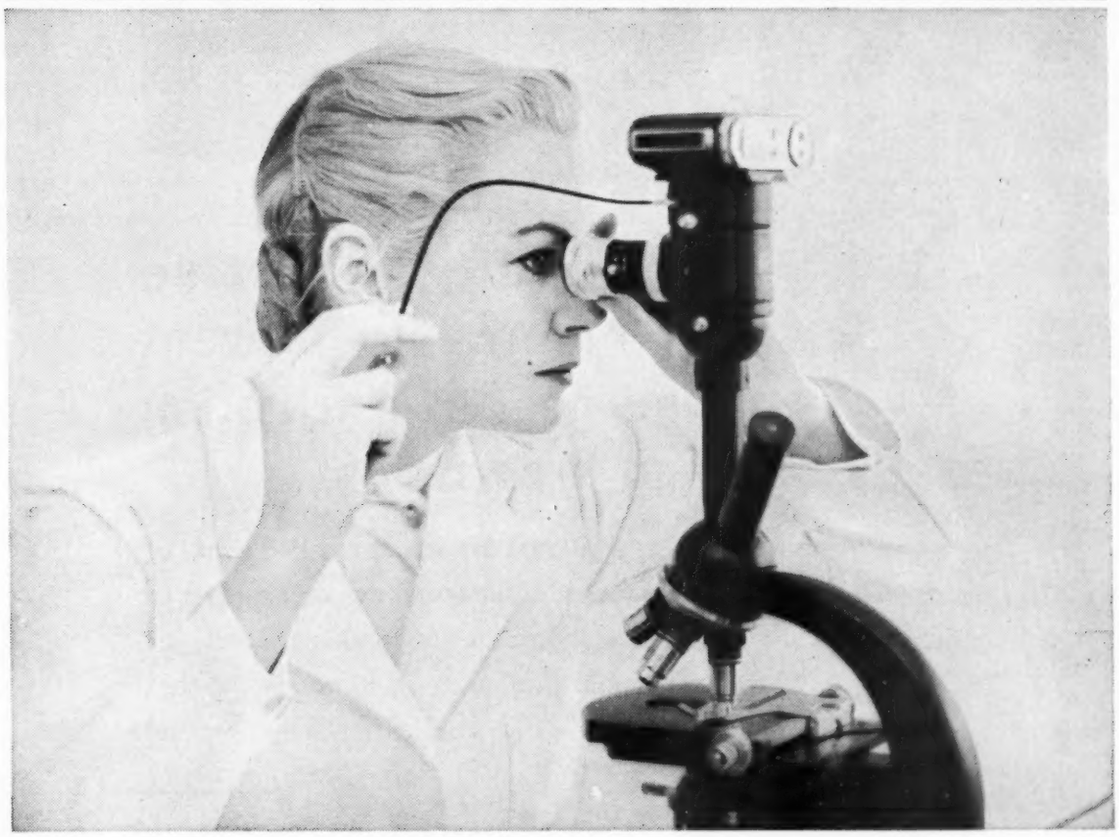
LOS ANGELES

Sulfathalidine®

PHTHALYLSULFATHIAZOLE

for reliable intestinal antisepsis

MAJOR ADVANTAGES: Suppresses growth of intestinal bacteria.[1] Minimum systemic absorption[2] insures maximum local effect. An efficient adjunct to intestinal surgery.



Used routinely before and after intestinal surgery, SULFATHALIDINE suppresses intestinal bacterial growth, maintains a low bacterial count, and thus guards against the dangers of peritonitis. Its action is confined to the intestinal tract, since systemic absorption is insignificant.

SULFATHALIDINE favors early healing. It is virtually nontoxic.

SULFATHALIDINE is also an important adjuvant to the treatment of ulcerative colitis.

Dosage depends on body weight. The average adult dose is 8 to 12 tablets (each 0.5 *Gm.)* daily in divided doses. 'Sulfathalidine' can also be given as the pleasantly-flavored suspension, CREMOTHALIDINE®, each oz. containing 6.0 *Gm.* of 'Sulfathalidine.'

References: 1. N.N.R. 1954, p. 107. 2. J.A.M.A. 153:1516 (Dec. 26) 1953.

SHARP & DOHME

Philadelphia 1, Pa.
DIVISION OF MERCK & CO., INC.

after **ileostomy** and **colostomy**

DESITIN® OINTMENT

is **unusually effective** in helping to prevent and heal skin irritation and excoriation

DESITIN OINTMENT is not washed away or decomposed by excrement, perspiration or secretions. In fact, its soothing, lubricant and healing influence is *so persistent* that one application helps protect the skin *for hours*.

Non-sensitizing, non-irritant Desitin Ointment combines high grade Norwegian cod liver oil, zinc oxide, talcum, petrolatum and lanolin. Tubes of 1 oz., 2 oz., 4 oz., and 1 lb. jars.

samples *on request.*

DESITIN CHEMICAL COMPANY
70 Ship Street, Providence 2, R. I.

1. Grayzel, H. G., Heimer, C. B., and Grayzel, R. W.: New York St. J. Med. 53:2233, 1953. **2.** Heimer, C. B., Grayzel, H. G., and Kramer, B.: Archives of Pediatrics 68:382, 1951. **3.** Behrman, H. T., Combes, F. C., Bobroff, A., and Leviticus, R.: Ind. Med. & Surgery 18:512, 1949. **4.** Turell, R.: New York St. J. Med. 50:2282, 1950. **5.** Marks, M. M.: Missouri Med. 52:187, 1955.

the Fleet Enema

Disposable Unit

for routine
and
special purpose
enemas

Accepted for advertising in publications of The American Medical Association

- **Superior in cleansing effect** to a tap water, or saline enema of one or two pints . . . and less irritating than a soap-suds enema.
- **Rapid** — with the FLEET ENEMA Disposable Unit, the entire procedure can be completed in ¼ the time required with older more cumbersome methods.
- **Prompt and thorough evacuation** . . . a time-saving factor, particularly in preparation for examination.
- **Comfort to patient assured** . . . virtually no distention or side effects.

And in addition: "Squeeze bottle" permits one hand administration . . . distinctive rubber diaphragm controls flow while preventing leakage . . . rectal tube enclosed in sealed cellophane envelope, sanitary to time of use . . . readily disposable.

Each 4½ Fl. Oz. Fleet Enema Disposable Unit contains in each 100 cc., 16 Gm. sodium biphosphate and 6 Gm. sodium phosphate . . . an enema solution of Phospho-Soda (Fleet) . . . gentle, prompt, thorough.

C. B. FLEET CO., INC.
LYNCHBURG, VIRGINIA

'Phospho-Soda', 'Fleet' and 'Fleet Enema' are registered trade-marks of C. B. Fleet Co., Inc.

Have you tried all three?

"Specialist"®

EXTRA-FAST-SETTING

For clubfoot, fore-arm and other casts where an extremely fast-setting bandage is desired.

2" x 3 yd. 4" x 3 yd.
3" x 3 yd. 6" x 3 yd.

For walking-boots, long-term casts—and wherever maximal strength, minimal weight and effective moisture-resistance are essential.

3" x 3 yd.
4" x 3 yd. 6" x 3 yd.
4" x 5 yd. 6" x 5 yd.

"Specialist"®

FAST-SETTING

The bandage of choice for all general cast work.

2" x 3 yd. 5" x 5 yd.
3" x 3 yd. 6" x 5 yd.
4" x 5 yd. 8" x 5 yd.

Johnson & Johnson

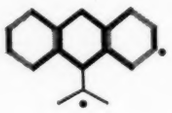
in surgery

THORAZINE*

calms the apprehensive and anxious patient
facilitates induction and intubation
potentiates analgesics and anesthetics
controls nausea, vomiting, hiccups and emergence excitement

"A measure of protection from shock is suggested in a number of cases."—Lear, Chiron and Pallin[1]

'Thorazine' Hydrochloride is available in ampuls, tablets and syrup.



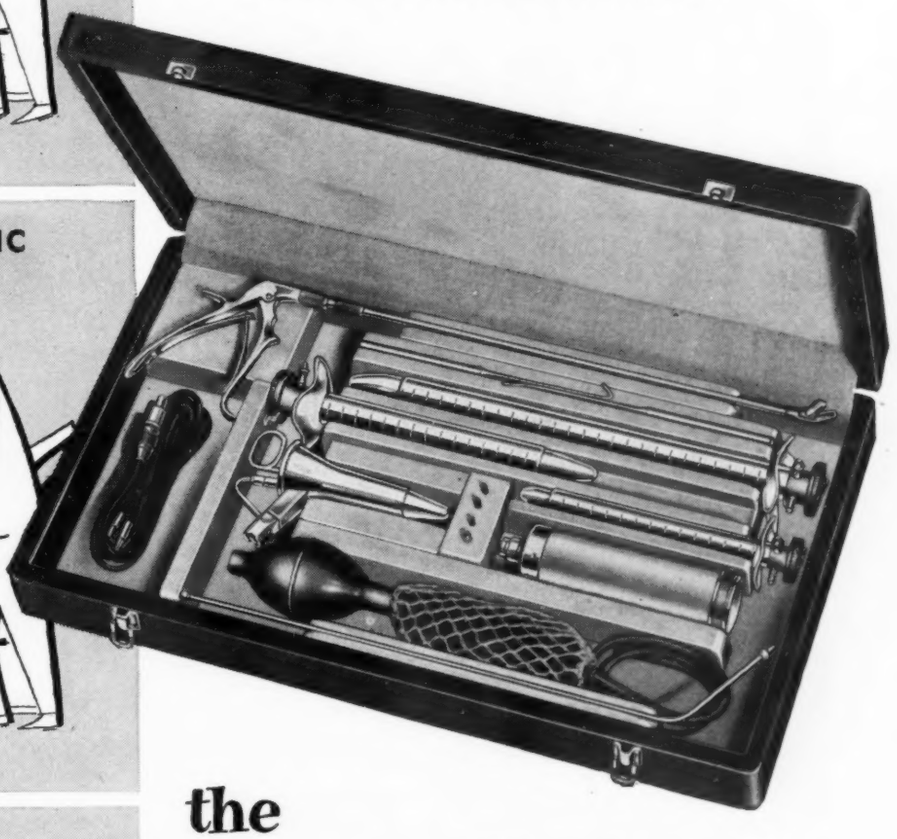
For information write:

Smith, Kline & French Laboratories
1530 Spring Garden St., Philadelphia 1

1. Lear, E.; Chiron, A.E., and Pallin, A.M.: Chlorpromazine—An Adjunct to Premedication, Clinical Report Based on 1,100 Cases, New York State J. Med. 55:1853 (July 1) 1955.

*T.M. Reg. U.S. Pat. Off. for S.K.F.'s brand of chlorpromazine.

For every step in proctological examination and treatment



the Complete No. 318 set by

WELCH ALLYN

Designed to fill every need of the proctologist for examination and treatment—yet so simple and easy to use that it is entirely practical for the GP without extensive proctological training. The new WA Advanced Design "full grip" biopsy forceps is included. Ask your surgical supply dealer to show you this splendid set.

a **NEW** and superior preparation for preoperative intestinal antisepsis

ENTEROBIOTIC® TABLETS

Oxytetracycline hydrochloride (Terramycin®) and neomycin sulfate

Experience at an outstanding medical center has demonstrated that administration of Terramycin and neomycin *in combination:*

- Is "extremely effective in eliminating the culturable aerobic and anaerobic bacteria from the intestinal tract of man."[1]
- "...permits one to limit the period of preoperative preparation to one and a half to two days and to lessen the likelihood of the development of resistant strains of Micrococcus pyogenes in the intestinal tract."[2]
- Is *not* associated with "any significant toxic reactions."[1]
- May become part of a "particularly efficacious"[2] program of preoperative preparation designed to reduce mortality and morbidity in patients undergoing intestinal surgery.

Tablets for oral use, each containing 50 mg. of Terramycin as the crystalline hydrochloride and 250 mg. of neomycin sulfate. Bottles of 40.

1. Dearing, W. H., and Needham, G. M.: Proc. Staff Meet., Mayo Clin. 28:507 (Sept. 9) 1953.
2. Bargen, J. A.: Surg., Gynec. & Obst.: 99:373 (Sept.) 1954.

Pfizer

PFIZER LABORATORIES, Brooklyn 6, N. Y.
Division, Chas. Pfizer & Co., Inc.

Nalline® HYDROCHLORIDE

(NALORPHINE HYDROCHLORIDE, MERCK)

First thought in narcotic-induced respiratory depression

MAJOR ADVANTAGES: Promptly increases both minute volume and respiratory rate; does not induce convulsions.

NALLINE is the first and only specific agent available for counteracting the respiratory depression induced by narcotics. In surgical patients heavily sedated with or sensitive to narcotics, NALLINE rapidly reverses respiratory depression and circulatory hypotension.[1] It also aids the induction of anesthesia in narcotized patients by increasing pulmonary ventilation and by minimizing retching and vomiting. The action of NALLINE is sustained for two to three hours.

INDICATIONS: Respiratory depression and/or circulatory collapse due to morphine, heroin, methadone, Dromoran®, Levo-Dromoran®, Nisentil®, Dilaudid®, Pantopon®, and Demerol®.

SUPPLIED: In 1-cc. and 2-cc. ampuls (5 mg./cc.). For parenteral use. NALLINE comes within the scope of the Federal Narcotic Law.

NEW DOSAGE FORM: NALLINE Neonatal, for injection via the umbilical vein. In 1-cc. ampuls containing 0.2 mg. N-allylnormorphine hydrochloride.

SHARP & DOHME

Philadelphia 1, Pa.
DIVISION OF MERCK & CO., INC.

REFERENCE: Adriani, J., and Kerr, M., *Surgery* **33**:731, May 1953.

* T-C JAWS

another development by SKLAR

* *Sklar Needle Holders incorporate Tungsten Carbide (T-C) as an integral part of the jaws. This revolutionary development eliminates the many disadvantages of welded inserts.*

NEEDLE HOLDERS WITH TC-JAWS
(Pat. Appl'd. for)
Crile
Baumgartner
New Orleans
Mayo 6"—7"—8"
Masson
Sarot
Collier
Heaney

Stainless Steel

T-C Jaws Assure....

POSITIVE GRIP . . . The extremely hard surface and extra fine serrations prevent rotation of suture needles without indenting the surface.

DEPENDABILITY . . . No inserts to loosen or fall out . . . original temper and strength of jaws is preserved.

To distinguish T-C Needle Holders from the standard instruments, the handles are copper plated for ready identification.

These superior and dependable instruments are priced slightly higher than our standard pattern Needle Holders.

Available through accredited surgical supply distributors

Sklar **LONG ISLAND CITY, NEW YORK**

new drying agent

for preanesthetic medication

Antrenyl®

Injectable Solution

. . . decreases salivary, pharyngeal and respiratory secretions

. . . "superior . . . to either atropine or scopolamine . . ."[1]

. . . prolonged drying effect—lasts 3 to 5 hours

. . . minimum postoperative nausea and vomiting—no urinary distress

. . . for all age groups and all types of surgery

Supplied:

Multiple-dose Vials, 10 ml., each ml. containing 2 mg. Antrenyl bromide.

1. Stephen, C. R.: Personal communication.

Antrenyl® bromide (oxyphenonium bromide CIBA)

C I B A

SUMMIT, N. J.

2/2117M

MEDICAL HORIZONS TV Monday P.M. Sponsored by CIBA ABC-TV

LIVITAMIN® with IRON
each fluidounce contains:

Iron peptonized..... .....420 mg.
(Equiv. in elemental iron to 70 mg.)
Manganese citrate, soluble..... .....158 mg.
Thiamine hydrochloride..... ..... 10 mg.
Riboflavin..... ..... 10 mg.
Vitamin B_{12} (crystalline) .... 20 mcg.
Niacinamide..... ..... 50 mg.
Pyridoxine hydrochloride..... ..... 1 mg.
Pantothenic acid .... 5 mg.
Liver fraction 1..... ..... 2 Gm.
Rice bran extract..... ..... 1 Gm.
Inositol .... 30 mg.
Choline .... 60 mg.

. . . the reconstructive iron tonic of wide application . . .

LIVITAMIN®

WITH IRON

In debilitation, syndrome therapy instead of symptom treatment is required. Livitamin (Massengill) provides comprehensive therapy and adequate nutritional support. The appetite improves, as does the blood picture . . . improved anabolism and better digestion produce a significant syndrome reversal.

LIVITAMIN® CAPSULES with INTRINSIC FACTOR
each capsule contains:

Desiccated liver..... .....450 mg.
Ferrous sulfate..... .....130 mg.
(Equiv. to 25 mg. of elemental iron)
Thiamine hydrochloride..... ..... 3 mg.
Riboflavin..... ..... 3 mg.
Niacinamide..... ..... 10 mg.
Vitamin B_{12} .... 5 mcg.
Pyridoxine hydrochloride..... .....0.5 mg.
Calcium pantothenate..... ..... 2 mg.
Folic acid..... ..... 1 mg.
Intrinsic factor USP..... .....1/6 Unit

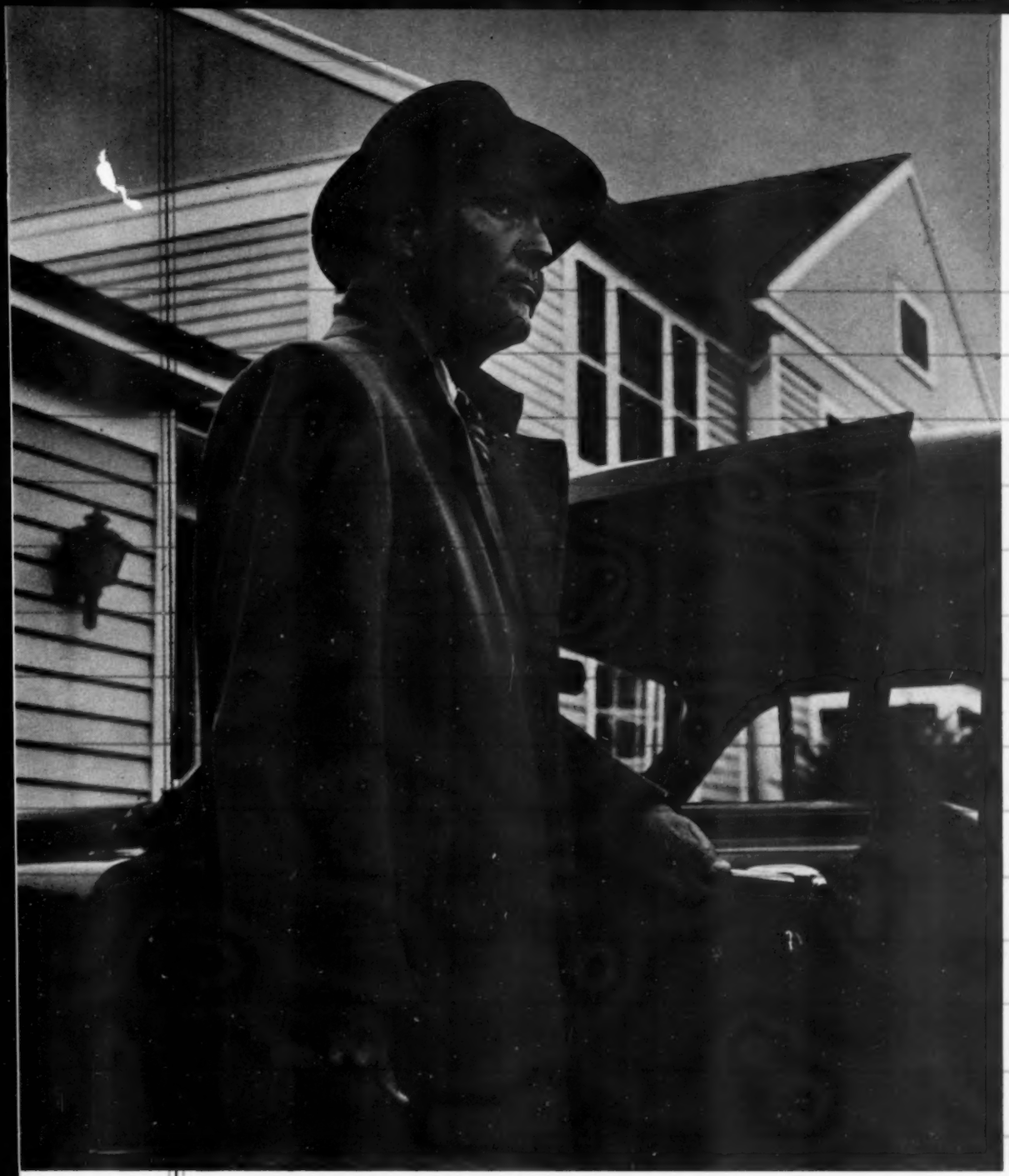
. . . in pernicious anemia and geriatrics . . .

LIVITAMIN®

CAPSULES WITH INTRINSIC FACTOR

Intrinsic factor is essential to provide full utilization of antianemic and nutritional factors in P. A. and many Geriatric patients. Livitamin Capsules with Intrinsic Factor (Massengill) contain intrinsic factor, U.S.P., iron and the B-complex vitamins. This integrated medication provides an optimal response in these difficult patients.

THE S. E. MASSENGILL COMPANY
BRISTOL, TENNESSEE



shot at sunrise —

The most annoying of calls to administer a narcotic is the call that comes in the early morning hours. Levo-Dromoran can be given orally to obtain longer and more complete pain relief than morphine by injection.

Levo-Dromoran® Tartrate 'Roche' - brand of levorphan tartrate

Hoffmann - La Roche Inc · Nutley · N.J.

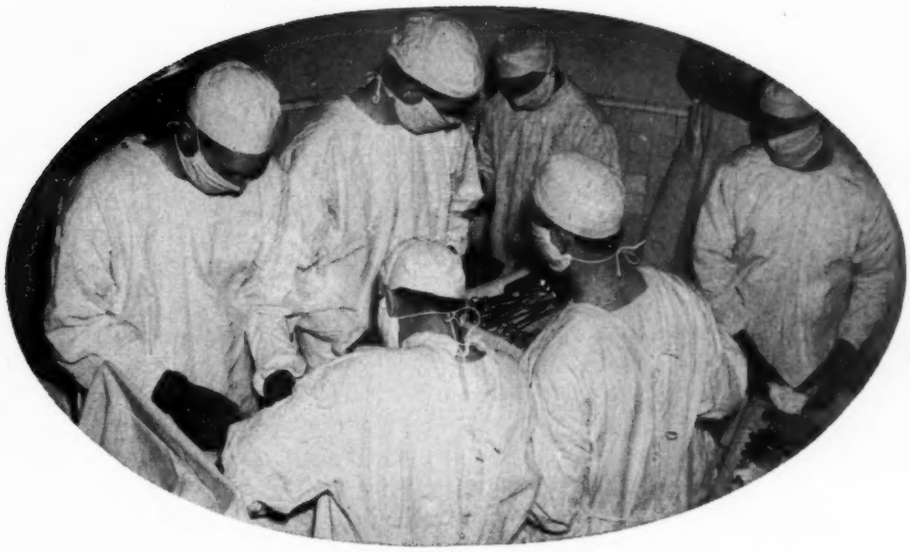
To relieve/prevent postoperative cough—

ROMILAR 'Roche' is a new, non-narcotic cough specific, especially useful following inhalation anesthesia.

Ten mg equals 15 mg of codeine in cough-suppressant effect - yet Romilar avoids central depression, nausea, anorexia and constipation.

Romilar® Hydrobromide - brand of dextromethorphan hydrobromide - tablets, 10 mg; syrup, 10 mg/4 cc

Hoffmann - La Roche Inc • Nutley • N.J.



A CLEAN GUT for gastrointestinal surgery

Neobacin®

NEOMYCIN-BACITRACIN TABLETS

For rapid practical sterilization of the gastrointestinal tract in 24 to 48 hours—the advantages of Neobacin Tablets are:

- Effectively destroys clostridia, diphtheroids and gram-positive and gram-negative cocci and bacilli.
- No significant absorption from gastrointestinal tract—free from systemic reaction.
- Lower incidence of peritonitis and other postoperative complications. Staphylococcus and proteus enteritis have not been observed.
- Extremely low toxicity, even with high dosages.

DOSAGE:

Adults—Four tablets four to six times a day.

Infants—One tablet four times a day.

SUPPLIED:

Tablets, each containing 25 mg. neomycin and 2,500 units bacitracin, in bottles of 30.

Neobacin®
OINTMENT
for infected dermatoses

R&C

REED & CARNRICK
JERSEY CITY 6, N.J.

Ready for you now...

Gudebrod's sutures in

DRI-PAK*

- Pre-cut lengths
- Heat sterilized by special technic
- Sealed dry in sterile tubes
- Shipped and stored in canister of sterilizing solution
- **Ready for immediate use**

Here are the finest non-absorbable sutures—dry and strong—in the most convenient hospital package. Strength and finish have been retained by use of special sterilizing technics developed especially for silk and cotton sutures.

*T.M.

AVAILABLE IN SILK:

COLOR CODED
TRADE MARK PAT. APPLIED FOR

OR

BLACK

AVAILABLE IN COTTON:

COLOR CODED
TRADE MARK PAT. APPLIED FOR

OR

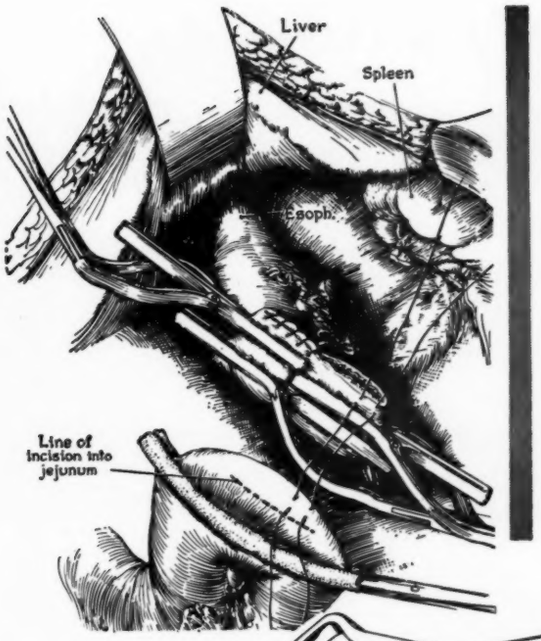
BLUE

write for complete information

Gudebrod BROS. SILK CO., INC.

225 WEST 34th STREET · NEW YORK 1, N.Y.

PHILADELPHIA · BOSTON · CHICAGO · LOS ANGELES · DALLAS



RIENHOFF *ARTICULATED* ABDOMINAL CLAMP

Designed for
William F. Rienhoff, Jr., M.D.
Baltimore

A new stomach or intestinal clamp for a more refined technic of gastrectomy . . .

This clamp offers many advantages in gastrointestinal surgery:

● Evenly Distributed Pressure

Pressure is applied in the center of the blades —there is no scissors-like action.

● *ATRAUMATIC Blades**

Fine teeth provide firm hold on viscus, yet do not penetrate or traumatize wall of stomach or intestine. Non-crushing. Tissue between blades is in no way devitalized nor is the circulation jeopardized. Only the serosa is penetrated.

● Positive Grip

No gauze or rubber covering of the blades is necessary—*Atraumatic* jaws ensure positive grip—will not slip.

● Versatile in Use

Articulated Clamps may be applied for any type of partial or total gastrectomy desired. The angle of the handle affords an excellent tractor to be held by a second assistant.

● Literature, "Technic of Use" is available.

B2490—$65.00 f.o.b. Phila.—Price subject to change without notice.

*Pat. No. 2668538

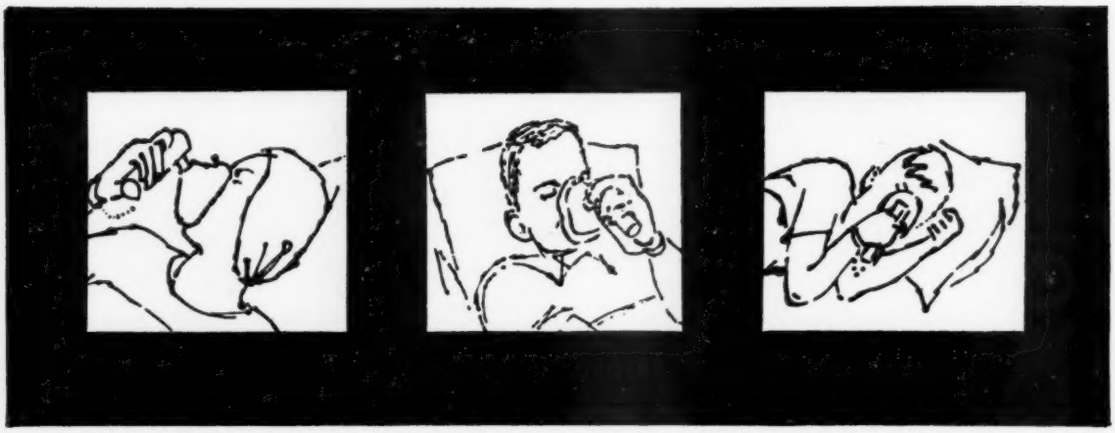
GEORGE P. *PILLING* & SON CO.

3451 WALNUT STREET

PHILADELPHIA

HEADQUARTERS FOR INSTRUMENTS FOR BRONCHOESOPHAGOLOGY

FOR SELF-ADMINISTERED INHALATION ANALGESIA



"Trilene"® *and the*

Brand of trichloroethylene U.S.P. (Blue)

"Duke"® University Inhaler

No. 3160 Model-M

- ***notably safe and effective***

"Trilene," self administered with the "Duke" University Inhaler, under proper medical supervision, provides highly effective analgesia with a relatively wide margin of safety.

- ***convenient to use***

The "Duke" University Inhaler (Model-M) is specially designed for economy, facility of handling, and ready control of vapor concentration.

- ***special advantages***

Induction of analgesia is usually smooth and rapid with minimum or no loss of consciousness. Patients treated on an ambulatory basis can usually leave the doctor's office or hospital within 15 to 20 minutes. Inhalation is automatically interrupted if unconsciousness occurs.

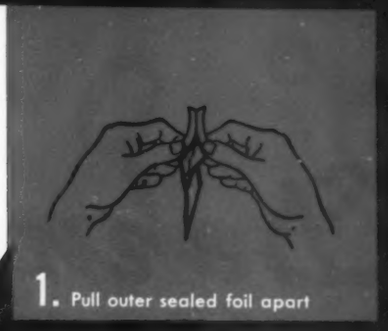
"Trilene" *alone* is recommended only for analgesia, not for anesthesia nor for the induction of anesthesia. Epinephrine is contraindicated when "Trilene" is administered.

"Trilene" is available in 300 cc. containers, 15 cc. tubes, and 6 cc. ampuls.

Ayerst Laboratories • New York, N. Y. • Montreal, Canada

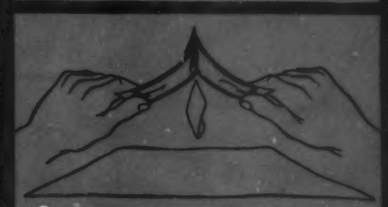
Ayerst Laboratories make "Trilene" available in the United States by arrangement with Imperial Chemical (Pharmaceuticals) Limited.

5556



1. Pull outer sealed foil apart

2. Remove envelope with forceps or . . .



3. Drop envelope on sterile table.

4. Remove pre-cut sutures with tab.

No suture tubes to break with

New D&G SURGILOPE*

STERILE PACK PRE-CUT ANACAP* SILK

Costs less

Stores in one-third of the space

D&G®

DAVIS & GECK INC.

A UNIT OF AMERICAN Cyanamid COMPANY

DANBURY, CONNECTICUT

*SURGILOPE AND ANACAP ARE D & G TRADEMARKS.

Deknatel

the synonym for surgical silk

as to have a graft to fit into the bifurcation of the aorta. The vein graft
id in the aorta and fastened with 4 to 6 sutures above and 3 sutures below a
each iliac vessel. The sutures are of 5-0 deknatel and are placed from the outside
in through the wall of the main artery, then intima everting through the vei
d out again through the arterial wall. These sutures are tied on the ou

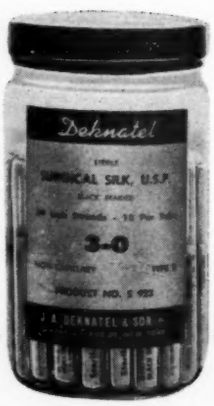
ion on the upper surface of the pulmonary artery (Fig. 11). An anasto
formed between the end of the subclavian artery and the side of the pu
by the use of No. 00000 Deknatel sutures. The suture is one which eve
of the vessels. The procedure is rendered easier if the posterior sutur

The approximated edges of the middle ⅓ of 4 cm. were tightl
a continuous suture of 00000 Deknatel. After making sure
n of the tube was watertight we turned the tube inside out.
sutured portion of the tube transfixed with silk

● *The First braided and treated surgical silk — and still the First*

from spools...

to sterile...



J.A. Deknatel & Son, Inc.

Queens Village 29, N.Y.

NOW!

EXCLUSIVE AUTOMATIC TILT on the *Ritter* Proctologic Table

Again, Ritter saves you more energy . . . more time for efficient treatment of your patients. The *new* Ritter Type 7-D-41 Proctologic Table brings you smooth, effortless, automatic hydraulic tilt. A light touch of the toe tilts this Ritter table to the exact position you wish. Both hands are left free to reassure your patient. Table is returned smoothly and quietly to horizontal by a touch of the toe. The automatic tilt mechanism is incorporated with the hydraulic base and has the same reliable smooth operating qualities.

Compare these Ritter features . . .

- **Automatic, hydraulic base and tilt mechanisms.**
- **Full 18 inch elevation range . . . 29″ to 47″.**
- **Maximum head-low of 50°.**
- **180° rotation.**
- **New side panels improve appearance and protect patient.**
- **Table top 20″ wide . . . meets all requirements, saves valuable treatment room space . . . offers greater accessibility to patient.**

Own this new Ritter Table for about a dollar per office day under the Ritter Professional Equipment Plan. Ask your Ritter dealer for complete details or write the Ritter Company, Inc., Ritter Park, Rochester 3, N. Y.

only Ritter makes it so easy . . .

COMPARE THESE RITTER FEATURES

a

Patient is positioned on table.

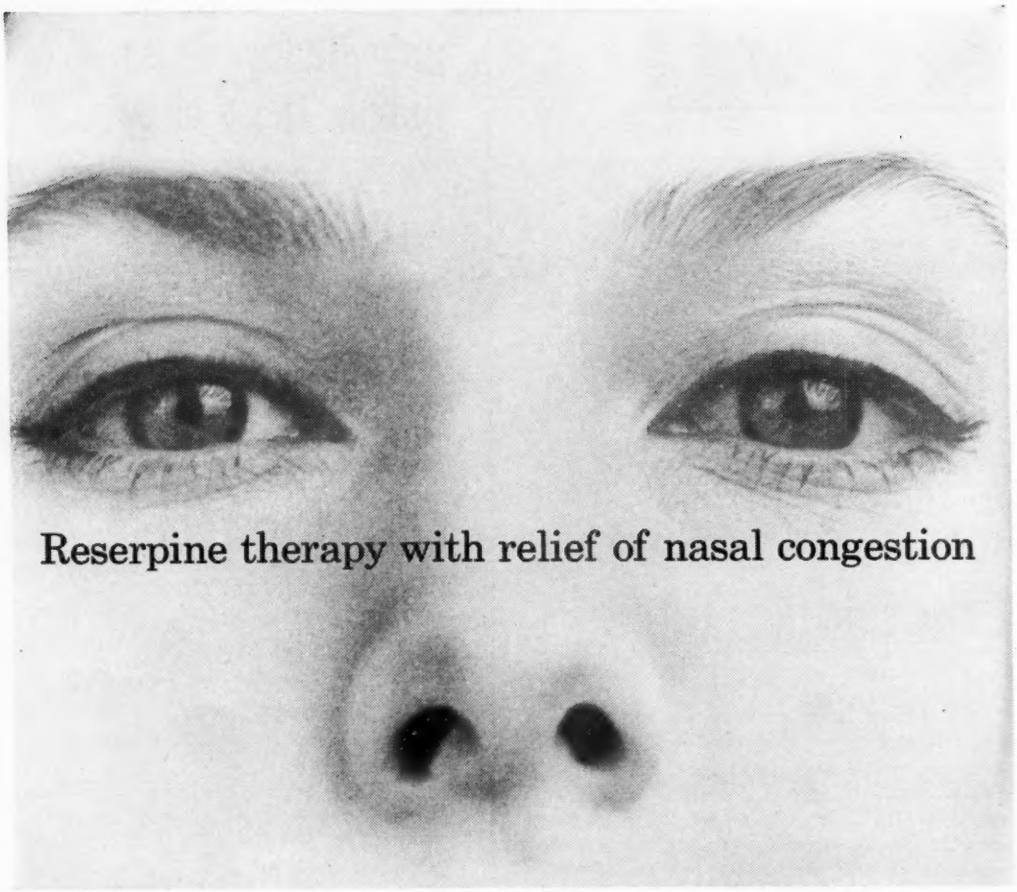
b

A light touch of the toe and the table tilts to the treatment position you wish.

c

Another touch of the controls with the toe and the table returns smoothly to horizontal.

Ritter Company Inc.



'Sandril' c 'Pyronil'

(RESERPINE, LILLY) (PYRROBUTAMINE, LILLY)

Approximately half of all patients taking any *Rauwolfia* preparation experience the annoying side-effect of nasal stuffiness. Clinical studies have shown that 'Pyronil' usually relieves this condition.

For your convenience, 'Sandril' and 'Pyronil' have been combined in one small tablet. Its 'Pyronil' content will relieve nasal congestion in about 75 percent of your patients who experience this troublesome side-effect.

Each tablet combines:
'Sandril' ..... 0.25 mg.
'Pyronil' ..... 7.5 mg.

DOSE: Same as with 'Sandril' alone.

ALSO: Tablets 'Sandril,' 0.1, 0.25, and 1 mg.
Elixir, 0.25 mg. per 5-cc. teaspoonful.

Lilly
QUALITY / RESEARCH / INTEGRITY

571073

ELI LILLY AND COMPANY • INDIANAPOLIS 6, INDIANA, U.S.A.

The American Journal of Surgery

A PRACTICAL JOURNAL BUILT ON MERIT

sixty-fourth year of publication

VOL. 90 NOVEMBER 1955 NUMBER FIVE

Presidential Address

PHYSICIAN FIRST—SPECIALIST SECOND

You have done me the honor of allowing me to serve as your President. The esteem of one's peers is truly a blessing in life.

I should like to share with you some of my most sincere reflections on the future status of the profession of medicine and of our specialty within the profession. One cannot have lived a full life and carried the responsibilities of leadership without some soul-searching contemplation. Let us consider and explore the following topics: (1) The training of younger physicians in our specialty of proctology; (2) the role of our Society in advancing knowledge in our specialty; (3) the relationship of our Society to the profession of medicine as a whole, and (4) the responsibility of each of us as physicians to our profession of medicine and to the public which it serves.

1. *The Training of Younger Physicians in Proctology.* Proctology is a specialized branch of surgery and as such demands extensive training in the requirements of diagnostic and surgical skills. One of our great needs is to encourage younger men, as they acquire their surgical residency training, to consider the field of proctology. However, in addition to this recruitment of able men with promise, I believe we should do everything we can to interest the general practitioner and other specialists in our work thus emphasizing the importance of proctology as a specialty and enhancing the service we can render to our patients.

As the scientific papers in our current program illustrate, the gynecologist and the obstetrician (to name only two specialists) can profit much by using the specialized skills of proctologists to help solve the complications of pregnancy. We know that the general practitioner is most often the first physician to see the patient and that he may later require our specialized services and skills. I think, therefore, it is almost axiomatic that all of us in our hospital or medical school teaching practice should be constantly on the alert to observe the oncoming generation of physicians and do our best to give them counsel on the clinical values of our specialty.

I believe a return of the preceptorship system in undergraduate medical education is needed. Indeed, it is already underway in many medical schools and it is here (where the young student spends some weeks with his preceptor, the established physician) that we can capture the imagination of our younger colleagues-to-be and eventually bring them into our specialty.

Twenty-two medical schools of the nation now have preceptorship training for senior year medical students. In ten of these medical schools the preceptorship is compulsory as part of the curriculum. In the other twelve schools it is elective. While the length of the preceptorship may vary from school to school, the average time is six weeks for the student.

It is in his preceptorship training that the student—working with a private practitioner of medicine—discovers, probably for the first

time, that medicine in private practice is quite different from the expectations derived from the textbook facts of his classroom lectures and the "ivory tower" training he obtains in a medical school or a university teaching hospital.

In the preceptorship program the student sees people as individuals, not merely as beds on a ward, and he begins to learn the vital importance of that very real but intangible thing called the doctor-patient relationship. He sees the private patients of his preceptor-physician responding to treatment often far better and faster than they would under the same treatment in clinics or on the wards because of this intimate doctor-patient relationship. The student thus begins dimly to realize that the practice of medicine is something more than batteries of diagnostic tests. He learns of the art and the science of medicine, and that it is important to treat the person as well as the disease.

There is, of course, no substitute for full time residency training in proctology or in any field of medicine. However, circumstances which are recognized by The American Board of Proctology make approved preceptorships in proctology necessary and desirable. According to the present special professional qualifications required by the board, a candidate may qualify in one of three ways. I quote from the September, 1954 folder. "He shall have completed: (1) Two years of approved general surgical residency and two years of approved proctologic residency; or (2) Three years of approved general surgical residency and two years of approved proctologic preceptorship; or (3) Two years of approved general surgical residency and three years of approved proctologic preceptorship."

It would be well for more medical schools and hospitals to encourage and provide facilities for graduate and resident training in proctology. This special field of surgery offers boundless opportunity for relief of acute and chronic inflammatory conditions of the colon, rectum and anal canal as well as early diagnosis and eradication of neoplastic lesions in these locations. Significant opportunities for clinical and laboratory research are also available, and for the physician in private practice there is an abundance of patients.

2. *The Role of Our Society in Advancing Knowledge of Our Specialty.* As members of The American Proctologic Society it is incumbent upon us to advance the knowledge of our specialized field of medicine. This we do among one another of our own group by our clinical presentations and proctologic surgical papers, each of which in its own small way broadens our horizons and contributes to the continuing postgraduate education of each of us. We are better proctologists this year than last; we shall be better proctologists next year than we are today.

This, too, is as it should be. However, I am reminded that a specialist (whatever his field) is a man who is said to know more and more about less and less.

I do not mean that we should all become philosophers—who know less and less about more and more—but that desirable as it may be to educate each other as we do, it is also most desirable to spread our knowledge to other branches of medicine. Too often, as I am sure you will agree, we see patients by referral at a very late stage in the course of their affliction. If other physicians, not proctologists, knew more about the basic elements of our specialty, they could more swiftly recognize conditions that could be corrected at an early stage and not at an advanced stage. This would be far better medicine, and more beneficial and less costly for the patient too. We should never forget that it is for the welfare of the patient that the profession of medicine exists.

How may we spread our knowledge to other branches of medicine? The older way is to hope that other physicians will read our specialized papers as they are published in *The American Journal of Surgery* or other medical publications. Such publication helps all proctologists in the education of each other, but I sometimes fear that it only fulfills the goal of teaching us, as proctologists, more and more about less and less.

As I have these fears I begin to believe that we should do much more. Instead of merely publishing papers on the latest tiny iota of our proctologic knowledge, I believe our Society might well consider as Society policy the encouragement of our members with the ability to write to publish down-to-earth, practical scientific papers of the generalized review type. These summary papers, through our Society, could then be submitted to the leading journals of the other specialties of medicine or surgery to help other specialists attain some of the basic, fundamental knowl-

edge of our field. We should not neglect journals in the general practice field as media for such publication.

I also believe that we should not only officially encourage our members to write such papers but also that the Society should buy reprints of these articles and distribute them to selected physicians. Indeed, each member of our Society might act as a distributor in his home town to see that the other physicians of his community would have the benefits of this basic proctologic knowledge. At this intimate, personalized level the "spreading of the gospel," so to speak, would arouse intense interest and be most effective.

To implement these suggestions I have drafted a resolution which will be submitted to a meeting of the Fellows for formal action.

3. *The Relationship of Our Society to Medicine as a Whole.* In the remarks which I have just made one can visualize an important step which our Society can make toward medicine as a whole. However, the "spreading of the gospel" of our specialized knowledge to the rest of the profession is only one approach.

In our turn (and remember this can be no one-way street) we, too, must keep an open mind and keep in touch with the progress of other specialties. We cannot expect them to listen to us and learn of our progress if we are not equally receptive in our turn.

Our Society publishes each year a bibliography of proctologic progress throughout the world. Thus we have at hand a convenient means of keeping abreast of advances in our specialty. I believe that the compilation of this bibliography should be a function of our Committee on Education.

I would suggest that this committee be broadened further so that it perhaps would have the title, The Committee on Education and Public Service, and that it would take on the additional function of selecting and distributing reprints of key articles to other physicians. The details would have to be worked out, but perhaps our Society could afford the expense of this reprint service to the rest of the profession. I do not mean to imply that we should send reprints to 165,000 physicians in the United States, but I am sure that each of our members could suggest ten or twenty other physicians in his home town who should have or would like to have such reprints.

4. *The Responsibility of All Individual Physicians to the Profession as a Whole and to the Public Which It Serves.* We are all physicians first and specialists second. This we must never forget. I urge all of you to enter into the activities of medicine on all fronts and not merely within our own specialty. It is all too easy to become immersed in our own private practice and let the rest of the physicians "run" organized medicine. I say this from deep personal knowledge because I have had the honor of being President of my local county medical society in Brooklyn, and I am well aware of the tremendous variety of problems which medicine faces today on many fronts—public health, medical economics and public relations.

Too many physicians show great apathy about their local county medical society. They will complain about it and say, "What do I get for my dues? Why don't they do something?"

All of you can do something about this problem in your own local community by expending personal activity and responsibility in the matter. I would strongly recommend that you serve on committees of your society, perhaps even assuming posts of leadership among the officers. You will find that this takes time, but I assure you that the participation not only brings personal satisfaction but also is deeply needed by the medical profession.

Perhaps in some Utopian community in this nation everything is perfect, but I doubt that such a community exists. I would urge you to work actively in your county medical society. Reflection upon the following questions may help improve any undesirable situation.

1. Are there conflicts between hospitals and physicians in your own community?

2. What about medical care plans in your community? Are the conflicts of health insurance in your city resolved or do they continue to present problems? Is free choice of physician by the patient provided in such plans? Is the fee schedule equitable, reasonable and just?

3. Is there any place in your community where a patient can go and get a fair and impartial hearing if he has a complaint, particularly on fees?

4. How are the public and press relations of your community for the medical profession? Is it a cordial relationship with the press, radio and TV? Or do the newspapers show antagonism and constantly snipe at the profession?

5. Do the physicians of your community enter into activities of voluntary health agen-

cies and the work of social welfare agencies? Or does the medical profession stay aloof in these matters?

I could go on with other key questions but I need not, for I am sure all of you recognize that these matters and the conflicts and problems which they raise are all within the province of your home town medical soceity. They are problems which your county medical society can help resolve if it has the will and the energy to do so. You in turn owe it to yourself and to the profession of medicine to see that your county medical society does something about these matters.

That does not mean that you should air your complaints only in hospital staff rooms. It means that you, yourself, should take action by working actively in your county medical society, thereby helping to remedy whatever needs to be done.

As specialists in our chosen field of proctology, the easy and unconstructive attitude is to withdraw into our clinical specialty and let the "other fellow" face the knotty problems which I have raised.

I am afraid, and this is why I emphasize the point, that too many physicians across the nation have taken just this same attitude of withdrawal into the specialties and thus seek to escape personal responsibility for the great and broad problems of medicine. Yet, by retreating into this "monastery" of specialized clinical medicine, these man have not helped but hindered and handicapped the profession of medicine.

I am sure you have heard patients say when asked what they think of medicine, "I think *my* doctor is wonderful but oh, that awful organized profession of medicine . . ." This means that the public is blaming the profession as a whole for its acts or rather its lack of action on important problems of medical economics, public relations and so on.

The point I should like to stress is that we specialists need to participate in the general affairs of medicine at the county medical society level. Just because we are proctologists does not mean we can solve the problems better than they are being solved now, but we must assume individual responsibility in an attempt to solve them. We cannot, in a word, escape the criticisms which the public now foists upon "the medical profession."

What the public thinks of doctors has also another aspect, namely, how we deal with our own individual patients. This applies particularly to physicians who are specialists.

In a recent major speech before the National Health Council, J. Robert Moskin, Articles Editor of the *Woman's Home Companion* had this to say of doctors:

"The doctors and you and we editors have to explain the story of medicine to all the people, if we want all the people both to support and derive the maximum benefit from medicine today.

"The problems of communication we have in common are three. These barriers are creatures of our times. They did not exist in our father's time.

"The first problem (the only one that I shall discuss) is the inhumanity of medicine. The impersonalization of medicine today. I mean just that: the inhumanity of medicine today. This is our greatest problem.

"It is almost a cliché to ask what has become of the old-fashioned family doctor. It is a cliché to you and me, but it represents a tragedy to the person (the patient) you and I are trying to reach when we work together."

Mr. Moskin was only citing the tiny fraction of physicians who act brusquely or with cold impersonality toward their patients. I am afraid that it is the specialists among the medical profession who are the greatest offenders in this regard. I do not say that all specialists, after their years of specialized training, should revert to the role of the old time country doctor of 1870, for the progress which has come from specialization would soon be lost if we retrogressed to the medicine of the time of Grover Cleveland.

We must never forget that patients are people and want to be treated as people, not as animated machines that have broken down in some function.

Specialists do not have to sit and listen to every variation of every complaint of every patient in the discussion of his health. That, I believe, is the role of the family physician who more and more is becoming the patient's "personal physician." He guides him to the right specialist or consultant and explains the implications of what has to be done, its costs and the role of the various specialists who may be needed.

The specialists, and we among them, have their part to play also in making medicine

once again a "human" profession. What we can do is to realize, that there is an art as well as a science of medicine. In this present era the science of medicine is at its zenith. In therapy, surgery and preventive medicine it truly performs wonders as the morbidity and mortality tables indicate.

We have to remember that when the science of medicine is at a high level, the physician who benefits by these new discoveries is apt to forget that curing the patient of his disease is not enough, at least not enough as the patient sees it. "How" he is cured becomes an equally important factor.

As I see the problem and as I interpret the remarks of the Editor whom I have already quoted, we must apply more of the art of medicine in our own individual practice. As we order the newest antibiotic by mouth or give it by injection (which we are virtually certain will prevent or modify infection in the patient) we must also apply some of the practical and very human psychology which used to be called the bedside manner.

I am convinced that such application of the art of medicine will bring us closer, psychologically, to our patients. The art and science of medicine must be blended; either alone is not enough.

We must become a friend as well as a physician. We become human as the patient wants us to become human. Thereby we not only help ourselves but also the profession of medicine as a whole in our own small way.

To each of you, members and guests, good health and dedication to the profession which you serve. My first impulse was to wish you success also, but I know that this is unnecessary for success will come almost automatically if you are dedicated men. This I know you are.

A. W. Martin Marino, M.D.,
Brooklyn, New York

Metastatic Cancer of the Liver

THE CLINICAL PROBLEM AND ITS MANAGEMENT

GEORGE T. PACK, M.D. (*By Invitation*) AND RICHARD D. BRASFIELD, M.D. (*By Invitation*),
New York, New York

From the Memorial Center, New York, New York. This investigation was supported in part by research grant No. C-2027 from the National Cancer Institute of the National Institutes of Health, Public Health Service.

FREQUENT metastases to the liver confirm the famous dictum of Virchow that organs which are most commonly involved by metastasis are seldom themselves the seat of primary growths. Many patients have had an abdominal wound closed with the pronouncement of inoperability of cancer somewhere in the gastrointestinal tract because of the surgeon's error in assuming that a palpable mass in the liver represented metastasis, when in truth it could well have been an asymptomatic hemangioma of long duration or a coincidental small cyst. On the discovery of one or two metastatic foci in the liver the surgeon naturally assumes that many others are possibly present, non-palpable and even microscopic in size. In the majority of instances this surmise is correct, but there are infrequent exceptions when the presumptive embolic shower of metastatic cancer cells or clumps of cells is not successfully implanted and they die without taking root. The solitary or few localized metastases in such a patient may be surgically excised with rewarding palliative results.

Incidence. Hektoen, Rolleston, Bland-Sutton and Willis have considered the liver tissue to be a most favorable soil for the successful implantation of metastases and their continued growth. This inherent receptiveness of the liver to transported cancer cells was explained by Bland-Sutton as due to the high nutritive qualities of the portal blood and abundant glycogen content of the liver. The vulnerability of the liver to metastatic tumors cannot be the sole responsible factor for this high incidence, although this theory probably obtains for the brain. The interposition of the organ in the anatomic pathways of circulation, namely, portal venous, hepatic arterial and lymphatics, places it in the role of catchment basin for many cancer cells in transit. The enormous surface expanse of the capillary bed should be an efficient filter. The opinion has been often expressed that the ratio of primary to secondary cancers in the liver is approximately 1:20, but this reputed incidence must be grossly in error inasmuch as 25 to 50 per cent of all patients dying of cancer are found on necropsy to have hepatic metastases.

CLASSIFICATION OF HEPATIC METASTASES

1. *Histogenesis:* malignant melanomas, malignant carcinoid tumors, lymphomas, adenocarcinomas of glandular origin from gastrointestinal tract, pancreas, breast, uterus, adrenals and prostate, neuroblastomas, epidermoid carcinomas from bronchus, esophagus, etc.

2. *Anatomic pattern:* (*a*) multiple spherical embolic metastases, discrete or confluent; (*b*) solitary discrete metastasis; (*c*) diffuse tumor pervading entire lobe without nodularity.

3. *Routes of transport:* (*a*) portal venous system; (*b*) hepatic arterial system; (*c*) lymphatic system; (*d*) direct invasion by contiguity.

4. *Time of appearance:* (*a*) The precocious metastasis. (Figs. 1 and 2A and B.) In this circumstance the metastatic cancer in the liver is clinically evident when the true primary cancer is unsuspected and in some patients not detectable. The enlarged nodular liver may be diagnosed as due to a primary tumor until biopsy proves otherwise or unexpected primary cancer is discovered elsewhere at laparotomy.

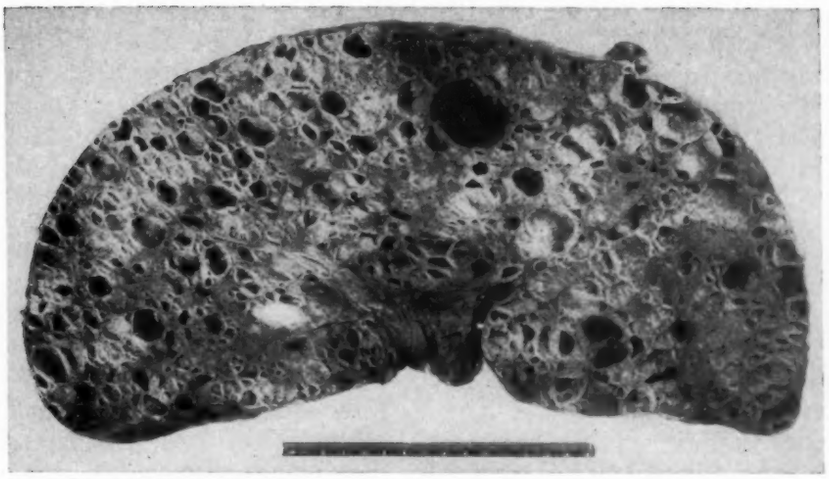
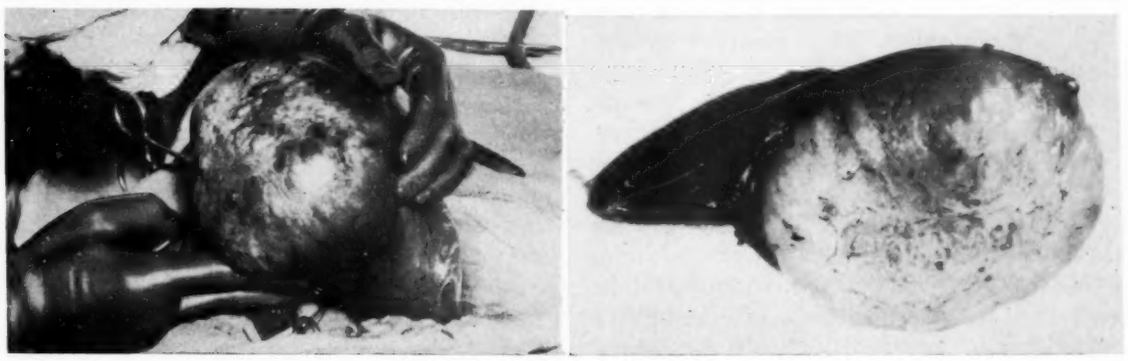


FIG. 1. Diffuse carcinoid tumor of liver; primary site undetermined.



2A 2B

FIG. 2. A, metastatic suprarenal cancer in left hepatic lobe. B, surgical specimen after left hepatic lobectomy for metastatic suprarenal cancer.

The original cancer may be so small as to be asymptomatic or even to defy discovery by the surgeon at exploratory laparotomy. Bulky metastases in the liver may be secondary to primary cancer hidden in the lung or in the intestinal tract; for example, malignant carcinoid tumor of the ileum.

(*b*) The synchronous metastasis. This situation exists when the surgeon operates with the intent of removing the cancer, usually intra-abdominal, and finds metastases already present in the liver; or, for example, at the time of initial examination of the rectum to ascertain the cause of rectal bleeding the examiner discovers an enlarged, nodular liver. Two decisions face the therapist at such a time: Should the primary cancer be removed for palliative purposes? Should the hepatic metastases be extirpated by one of the technics available? The judgment of the surgeon must be based on the nature and number of such metastases, their size and extent, and his estimate of the patient's life expectancy. If the liver is completely involved, it is merciful wisdom to do nothing. If the hepatic function is good and the primary cancer is provoking distressing symptoms with partial or impending obstruction of a viscus, etc., it could properly be excised as a means of obtaining the best palliation. Also, if the hepatic metastases are few, small and limited in extent, it may be feasible also to remove them by "metastasectomy."

(*c*) The metachronous metastasis. If a patient has undergone a successful operation for intra-abdominal cancer deemed curable at the time but later presents evidence of hepatic metastasis, the problem of subsequent management is controversial. The common practice is to withhold treatment. The first effort is to investigate the location of the original cancer in order to determine whether or not local recurrence is present, as this knowledge may decide the future course of action. If residual cancer at the primary site is not

evident, the obvious conclusion is that hepatic metastases, cryptic at the time of the excisional operation, are now making their initial appearance. With this setting the surgeon is more inclined to consider surgical removal of the hepatic metastases if this is feasible. Perhaps the strongest indication for metastasectomy occurs when a very long latent period (one to five or more years) intervenes between the treatment of the original cancer and the discovery of the hepatic metastases. In 1941 Goligher found that of thirty-one patients who had died within a few days of excision of the rectum, five were shown at necropsy to have unsuspected metastases deep in the liver. The best example perhaps is the latent appearance of metastatic ocular melanoma in the liver apparent sometimes years after enucleation of the eye or exenteration of the orbit.

Gross Anatomic Patterns of Hepatic Metastases. Most metastases in the liver are circumscribed growths, not commonly infiltrative. These secondary deposits seem to occur more frequently near the surface of the liver rather than in its depth. With the expansile growth of these nodules central necrosis or degeneration of the core may occur with resultant fibrosis and contraction, thus producing the pathognomonic umbilication of metastatic cancer. Calcification seldom occurs but internal hemorrhage and cavitation of these spherical masses of metastatic cancer is sometimes seen. The nodules of course may vary in size from a minute dot to a conglomerate mass occupying the entire lobe. The liver may be of colossal enlargement, even weighing 5 to 20 pounds, yet it may retain its characteristic shape. Glisson's capsule tends to confine the growth although it bulges over the individual masses. The consistence of the masses depends upon the proportion of connective and vascular tissues present in their substance. The metastases may occupy so much of the liver and compress the adjacent normal liver tissue to such an extent that at necropsy the quantity of healthy liver is barely visible and one wonders how the condition could have been compatible with life. Metastases in the liver do not have the well developed capillary stroma which characterizes primary hepatomas: Mann, Wakim and Baggenstoss by using an injection cast method, demonstrated that hepatomas were supplied almost exclusively by the hepatic arterial system. The metastatic cancers have a more intimate relation with the portal venous system through which the tumor emboli are afferently transported. The less frequent pattern of hepatic metastasis is the ill defined diffuse infiltration of the entire liver which may not cause nodularity, distortion of contour or increase in weight of the organ (the so-called secondary neoplastic atrophic cirrhosis of Cracium). It is found usually in patients with mammary cancer or malignant melanoma. In contradistinction to cancer in other organs, hepatic metastases seldom extend beyond the confines of the liver to invade adjacent structures. Ascites in the presence of metastatic cancer in the liver may be caused by one of three mechanisms: (1) compression of the portal vein by large masses projecting into the hilum, (2) extensive permeation of the portal capillaries and venules by the tumor, and (3) the desmoplastic fibrosis or cirrhosis induced by some diffusely scattered metastases as described by Cracium.

Extrahepatic Portal Dissemination of Metastatic Cancer. Cancer emboli destined for deposit in the liver reach this organ chiefly by way of the portal vein. Primary cancers of the viscera or tissues in the portal region of venous drainage, i.e., the lower esophagus, stomach, gallbladder, pancreas, small intestine, colon and rectum, are the common sources of such emboli. Cancers metastatic to these viscera may drain secondarily into the liver. There are also occasional venous anastomoses or congenital portacaval shunts which may explain some of the vagaries of metastatic deposits. By injection experiments Madden has shown a natural fistula between the ovarian veins and branches of the portal system which could well explain the enigma of the Krukenberg tumor. Cancers of the ovary, uterus, prostate, bladder, kidney and suprarenal glands by invading contiguous portal-drained tissues can disseminate embolic metastases by this route. Controversial and unproved as yet is the experimental and clinical evidence that venous blood from the various abdominal organs does not completely mingle in the short, wide portal vein proper but is segregated into a "stream within a stream," so that the left hepatic lobe receives a disproportionate quantity from the splenic vein and the right hepatic lobe receives a disproportionate quantity from the superior mesenteric vein. If this were consistently true, it would explain and in fact

predetermine the varied distribution of metastases from the portal viscera.

Hepatic Arterial Metastases. Metastases to the liver via the hepatic artery are difficult to demonstrate and prove by histologic evidence because the tumor emboli grow rapidly and destroy the vascular relationships, whereas in the lungs one can often visualize the embolic deposits in terminal arterioles. When hemic metastases occur from any cancer, arterial-borne secondary deposits in the liver are always possible. The usual source of hepatic arterial metastases is the lung, wherein the cancers may be primary bronchogenic or metastatic to the lung, as for example renal, mammary and testicular cancers.

Lymphatic Dissemination to the Liver. Extension of cancer to the liver via the lymphatics is probably uncommon; one seldom sees lymph vessels permeated by cancer except in the immediate vicinity of massive metastases. In 1922 Handley was convinced that hepatic metastases from breast cancer developed through lymphatic permeation by way of the epigastrium and diaphragm to lodge generally on the convex surface of the liver near the falciform ligament.

Direct Invasion of Liver by Contiguity. Cancers of the gallbladder, stomach and splenic flexure of the colon may involve the liver by direct extension although Glisson's capsule is relatively tough and constitutes a temporary barrier to tumor penetration. The initial adherence to the liver is sometimes effected by a plastic exudate caused by infection of the gastric or colonic cancer: some time later infiltration through this fibrous synapse occurs.

Intrahepatic Dissemination of Metastases. The manner of intrahepatic redissemination is identical for primary hepatomas and metastatic cancer. Willis[11] has contributed much to our knowledge of this mechanism although Ribbert was first to describe it. The metastatic cancer extends along the capillary and extracapillary intercolumnar spaces causing compression atrophy of the liver parenchyma. The arteries and bile ducts are long resistant to the invading cancer and may be seen deep within the metastatic cancer nodules. Perforation of the cancer into bile ducts occasionally occurs but tumor thrombi are frequently found within the lumens of the veins. According to Willis, the cancer invades a portal branch vein and then is carried to a peripheral venule in the territory supplied by the invaded vein; the embolized venule on becoming occluded by the tumor serves as a focus for the origin of new metastases. Willis emphasizes the importance of the size of the invaded vein, as it determines the area of distribution of the next progeny of secondary metastases. For example if it is a small peripheral venule of the portal tree, the embolic shower is only to neighboring lobules with metastases which are satellite to the parent tumor; but if a large peripheral branch or a central branch of the portal vein is involved, the scope of intrahepatic dissemination will be correspondingly greater. Finally, if invasion of the main right or left portal divisions develops with thrombus formation, one may anticipate a seeding of the cancer throughout an entire hepatic lobe. Metastases occurring first in the liver may serve as a relay station for further embolization to the lungs, either by way of direct invasion of the vena cava or by involvement of the efferent hepatic veins.

Course of Metastatic Cancer in the Liver. In general, secondary tumors in the liver grow far more rapidly than the primary cancers. The deposits in the liver frequently exceed the primary cancer in bulk. The hepatic metastases may continue to enlarge while the original cancer in stomach, bowel, breast or pancreas remains small and inconspicuous. According to Willis, the mitotic count in secondary hepatic tumors is five times that which occurs in the primary cancers; in two of Willis' cases the mitotic activity of the hepatic metastases was eleven and fourteen times that of the respective primary growths. The liver involvement rather than the primary neoplasm may be the immediate cause of death. Massive intraperitoneal hemorrhage from metastatic adenocarcinoma in the liver has been reported by Specter and Chodoff.[9] The rapidity or slowness of growth of hepatic metastases is unpredictable; as examples, an experience with two young men with cancer of the distal colon may be cited. One patient, who had no palpable or demonstrable evidence of metastasis in the liver at the time of colonic resection, was dead within two months with a liver so large as to occupy the entire abdomen. Another patient, who had three palpable metastatic foci in the liver at the time of colectomy, lived asymptomatically for three years after operation without apparent enlargement of the metastases. The mysterious behavior of hepatic metastases

FIG. 3. Extrinsic pressure defect shown on roentgenogram. Endothelial myeloma of humerus metastatic to liver.

from ocular melanoma has never been satisfactorily explained; clinical recognition of these cryptic metastases may not be apparent for three to twenty years after enucleation of the eye or exenteration of the orbit for the primary melanoma. What humoral or local tissue factors conspire to permit metastatic melanoma to remain viable yet quiescent during such a long latent period between the time of deposition and the recrudescence of growth? Spontaneous regression of hepatic metastases has been reported, but we have never found a recorded instance wherein the diagnosis of metastatic cancer was proved by biopsy.

DIAGNOSIS OF METASTATIC CANCER IN LIVER

A differential diagnosis between primary and metastatic tumors in the liver can usually be established by historical review and careful physical examination. History of earlier excision of visceral cancer in the portal area, breast or eye, or the known presence of concurrent primary cancer in addition to the liver enlargement, is sufficient basis to assume that a nodular liver contains metastasis. Without this information every effort should be made by physical, endoscopic and radiographic examinations (Fig. 3) to ascertain if primary

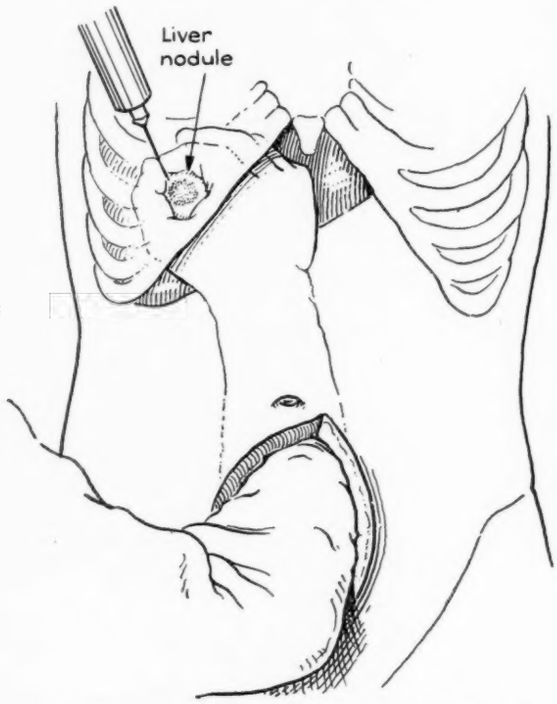


FIG. 4. Aspiration biopsy of mass in liver under intra-abdominal finger guidance. Metastasis suspected at time of pelvic laparotomy.

cancer elsewhere is detectable before assuming that a nodular liver indicates a hepatoma. Recourse to biopsy by the aspiration technic (Fig. 4) or through a small exploratory incision or peritoneoscopic study may solve the problem. For the comparative value of these facts, certain generalizations are in order. Hepatomas are usually of more rapid growth than metastatic cancers in the liver, but the latter are of more frequent occurrence and are situated more superficially. Cirrhosis is a more constant accompaniment of primary liver cancer and jaundice is caused to a greater degree by metastatic cancer. If bone metastases have been ruled out, an elevated serum alkaline phosphatase level may be of significant diagnostic value in the case of secondary cancers inasmuch as it is a more consistent finding than an increased serum bilirubin. In our experience melanuria is usually demonstrable in suspected

cases of melanoma only when hepatic metastases exist.

Serum Alkaline Phosphatase Determination and Bromsulphalein Test in the Diagnosis of Metastatic Cancer of the Liver. The association of elevated serum alkaline phosphatase values with metastatic cancer in the liver was reported by Flood, Gutman and Gutman in 1937[1] (seventeen of twenty cases) and by Meranze, Meranze and Rothman[8] in 1938. If only the increased concentration of serum alkaline phosphatase were determined, the significance of the test would be lessened by the possibility of bone disease being the disturbing factor. Shay and Siplet[8] have demonstrated that the elevation of serum alkaline phosphatase in the absence of hyperbilirubinemia in a patient who is to have or has had resection for primary cancer in another organ constitutes a test approaching specificity for liver metastases, especially if the bromsulphalein test shows abnormal levels of serum retention of the dye. Occasionally granulomatous diseases of the liver and rarely gallstones may simulate this condition with similar laboratory findings.

Serum Glutamic Oxalacetic Transaminase Activity As an Indicator of Metastatic Cancer in the Liver. Glutamic oxalacetic transaminase is present in relatively high concentration in the liver. Wroblewski and LaDue[12] have found that the serum level of this enzyme is an index of liver cell destruction by its release from damaged liver cells. They reported that twenty of twenty-two patients with hepatic metastases had increased serum glutamic oxalacetic transaminase (SGO-T) activity. In seven patients increased SGO-T activity was the only evidence of liver metastases, ranging from 46 to 140 units (normal values from 10 to 40 units). In thirteen patients the SGO-T index varied from 60 to 230 units with the alkaline phosphatase and other liver function tests also abnormal. In only two patients, both with minute microscopic foci, were the SGO-T levels and liver function tests within normal limits. Wroblewski and LaDue also report that twenty patients with elevated serum alkaline phosphatase secondary to various abnormalities of bone all had normal SGO-T activity in the absence of hepatic dysfunction.

In one patient upon whom one of us (G. T. P.) performed a total right hepatic lobectomy for metastatic cancer occupying 90 per cent of the lobe, the preoperative SGO-T levels were 60 to 80 units, rising to 200 units immediately after lobectomy and reducing to normal levels concomitantly with recovery of the patient.

Wroblewski and LaDue conclude that the serum glutamic oxalacetic transaminase activity appears to be a relatively sensitive index of hepatic metastasis.

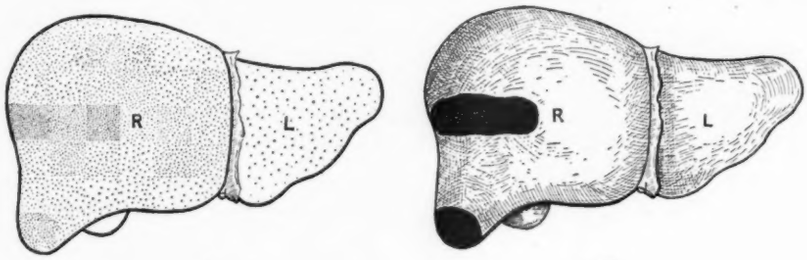
Portal Venographic Diagnosis of Metastatic Cancer in the Liver. Portal venograms, usually splenoportal venograms, have been most commonly employed in patients with portal hypertension in order to determine the exact location of the obstruction, i.e., whether it is intra- or extrahepatic. Within the liver the obstruction may be due to cirrhosis or to cirrhosis associated with portal venous thrombosis. Extrahepatic obstruction may be localized within the portal vein proper or in one or more of its major tributaries. The portal venogram may demonstrate congestive splenomegaly and esophageal and gastric varices. Now that metastasectomy is being performed with greater frequency, the use of transcutaneous splenic portovenograms to demonstrate by visualization the location and number of metastases within the liver may be of increasing value.

To demonstrate cryptic metastases in the liver one may either employ the transcutaneous splenic puncture and injection under local anesthesia or utilize a tributary of the portal vein at the time of laparotomy. In the former procedure the fasted patient is placed supine on the x-ray table. Under local anesthesia a small spinal puncture needle is introduced medially and slightly posteriorly through the ninth intercostal space into the spleen. The contrasting radiopaque solution (20 to 40 cc. of 35 to 75 per cent of diodrast® or urokon®) is injected rapidly over a period of five to ten seconds with the x-ray exposure being made while the last 5 cc. of fluid are being introduced.

The pattern of the intrahepatic circulation may be of considerable diagnostic significance in obscure hepatomegaly since discrete foci of distortion of the intrahepatic portal venous tree may be caused by metastatic cancer.

Detection of Hepatic Metastases by Selective Concentration of Radioalbumin. (Fig. 5A and B.) Stirrett, Yuhl and Libby[10] employed radioactive iodinated human serum albumin as a tracer agent and found an increased concentration of the radioalbumin in liver metastases which they attributed to possible specific affinity of the tumor cells for the compound or

perhaps to the increased vascularity and cellularity of the metastatic lesions. They give the patient a single intravenous dose of 300 mc. of radioactive albumin and twenty-four hours later a survey is made at coordinate points over the thorax and abdomen by using a scintillation counter to detect gamma radiation from the radioactive iodine (I-131). They found that the radioactivity in hepatic metastases averaged 31 per cent greater than in normal adjacent tissue and that the bulk of metastatic involvement rather than the specific histogenesis of the tumor was the factor deciding the degree of increased radiation. The smallest metastasis detectable by this means was 2 cm. in diameter. Contraindications to the employment of this hepatic radioactivity survey are ascites and inflammatory lesions in the liver. Stirrett et al. therefore advocate the routine employment of hepatic radioactivity under two circumstances: (1) preoperative evaluation of patients with cancer and (2) follow-up observational studies after cancers have been extirpated.



5A 5B

FIG. 5. Location of hepatic tumor by the concentration of radioactive iodinated serum albumin by the tumor. A, graphic representation of the localization of the radioactive iodinated serum albumin in different segments of the liver as determined by a scintillation counter one hour after injection of 30 microcuries of RISA. B, site of tumors metastatic to liver as observed at operation. Note the correlation between the concentration of RISA within the liver and the location of the hepatic tumors.

TREATMENT OF METASTATIC CANCER IN THE LIVER

The technical problems involved in the surgical treatment of metastases in the liver are the same as for primary tumors. The controversial issue is whether or not to treat any hepatic metastases, in view of the incurability of this state. At the moment the question is not concerned with cure as it is the hoped-for palliation by such treatment. Recent improvements in the surgical management of liver diseases encourage attempts to extend the palliation of cancer by such experimental surgery as metastasectomy and partial and total hepatic lobectomy. There is no reason to believe that local organ immunity can be developed in the liver by the growth of hepatic metastases and that the surgical excision of grossly visible lesions would permit the liver to resist further growth of smaller embolic deposits. Some of the conditions under which treatment of hepatic metastases may be attempted are: (1) The clinical judgment of the surgeon is imperative, based on the size and number of metastases, the proportion of the liver implicated, the unilaterality or bilaterality of involvement, degree of hepatic dysfunction and the condition of the patient. (2) Lymphomatous involvement of the liver is treated solely by irradiation. (3) There should be no systemic metastases. (4) There should be no other intra-abdominal dissemination of the cancer. (5) The primary cancer could have been previously excised with no inoperable recurrence. (6) A concurrently discovered primary cancer or a recurrent cancer is resectable. (7) Metastasectomy, even multiple, may be performed in one or both lobes if the metastases are few and accessible. (8) Left hepatic lobectomy is sometimes feasible whenever direct invasion occurs from gastric or colonic cancer. (9) Total hepatic lobectomy for metastatic cancer may be considered only if the opposite lobe appears free and if the lobe to be resected is grossly involved. (10) Another condition under which treatment may be attempted is metachronous metastasis to the liver if surgical removal of the metastasis is

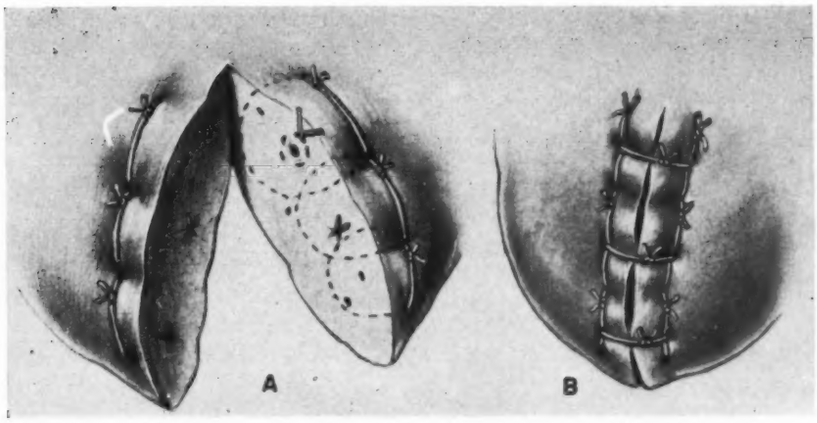


FIG. 6. Interlocking mattress sutures placed prior to partial excision of liver. Apposition sutures placed around parallel mattress sutures to secure coaptation of wound margins without tearing fragile liver.

technically possible and when the primary cancer has been removed a considerable time before, as in the case of ocular melanoma.

CASE REPORTS

Unusually Rapid Course of Metastatic Cancer in Liver

CASE I. G. G., a forty-one year old man, had complained of intermittent lower abdominal cramps with diminution in caliber of the stools and occasional rectal bleeding for six months. Radiographic study revealed a filling defect in the sigmoid colon interpreted as carcinoma. Laparotomy was performed on April 27, 1953, and a left hemicolectomy was completed with anastomosis of the transverse colon to the rectosigmoid. There were no palpable lymph nodes in the mesocolon and both lobes of the liver were smooth and free of any clinical evidence of metastatic involvement. The pathologist found adenocarcinoma of the bowel with no metastases to regional lymph nodes. The patient was discharged from the hospital on May 6th. On June 4th, seven weeks after the operation, the patient was jaundiced. At first the jaundice was considered possibly to be of hepatocellular origin secondary to serum reaction following his blood transfusions. On July 6th the liver was very large and nodular. Aspiration biopsy revealed carcinoma. The patient died on August 27th with an enormous liver occupying almost the entire abdomen and associated with ascites. Death occurred exactly four months after the operation, at which time no metastases were clinically apparent.

Metachronous Metastasis in Liver—Ocular Melanoma

CASE II. I. C., a forty year old white woman, had an enucleation of the right eye for malignant melanoma in 1936. In May, 1949, she observed abdominal fullness and right upper quadrant abdominal pain associated with weakness. A laparotomy was performed at another hospital for the purposes of hysterectomy with a diagnosis of fibromyomas of the uterus. A large mass was felt and seen to occupy the right lobe of the liver. It was diagnosed as metastatic malignant melanoma. Six weeks later the mass was palpable occupying a large portion of the right upper abdominal quadrant. Intermuscular injections of attenuated rabies vaccine were given daily for thirty consecutive days with definite regression in the size of the mass. There was no evidence of pulmonary metastasis. Cholecystographic studies showed a pressure defect in the gallbladder suggestive of an extrinsic mass.

On January 18, 1950, an exploratory laparotomy was performed. A firm, black tumor measuring 7 cm. in diameter was observed on the inferior edge of the right lobe of the liver with a few similar spherical masses smaller in diameter contiguous with the larger mass. The left lobe of the liver was free of palpable metastases. There was no ascites and no evidence of intra-abdominal melanomatosis. The tumor of the right lobe of the liver was removed by surgical excision in segmental fashion. The gallbladder was not removed. The defect in the liver was closed with interrupted interlocking mattress sutures of chromi-

FIG. 7. Case III. Outline of palpable liver tumor. Laparotomy elsewhere said to reveal inoperable hemangioma of right lobe. At operation we found an operable metastatic carcinoma in left hepatic lobe with cryptic primary site.

cized catgut. (Fig. 6.) The postoperative course was uneventful.

The patient subsequently gained in weight from 92 to 118 pounds and was free of distressing symptoms for almost eighteen months. Recurrence subsequently developed and the patient died six years after the date of partial hepatectomy.

Comment. Surgical excision of metastatic melanoma in the liver provided a definite palliative benefit for the patient.

Left Hepatic Lobectomy for Metastatic Cancer

CASE III. M. P., a thirty-six year old woman was first seen on July 28, 1953. For eighteen months she had been aware of swelling of her abdomen. The first physician she consulted gave her symptomatic treatment for constipation. There was a slowly progressive increase in size of the mass and a heavy sensation in the right upper quadrant associated with anorexia.

On July 8, 1953, an exploratory laparotomy had been performed at another hospital, with the presumptive diagnosis of ovarian cyst. The submitted report of this operation was: "A large hemangioma of the liver was attached to the right lobe of the liver and extended down into the right pelvis." A biopsy was taken which revealed no evidence of a malignant tumor.

Physical examination at the time of her consultation here revealed the enormous tumor occupying the entire right abdomen and extending down to the brim of the pelvis. (Fig. 7.) The patient was admitted to the Memorial Hospital on August 1st for operative treatment. On August 5th a left partial hepatectomy was performed through a thoracoabdominal incision (Fig. 8.) The left lobe of the liver was markedly enlarged and extended to the symphysis pubis, and almost completely filled the anterior abdomen. It was smooth in contour with a few large lobules of tumor which were yellowish white in color. The right lobe of the liver was slightly enlarged and contained an irregular 8 cm. circular mass deep in the central portion of the right lobe. After resection of the left lobe this mass was quite indefinite and certainly not as large as noted before resection. The conventional left hepatic lobectomy with vascular control was performed (Fig. 9.)

The specimen consisted of the left lobe of the liver largely replaced by tumor, the total mass weighing 1,660 gm. and measuring 28 by 18 by 5.5 cm. (Fig. 10.) A second smaller discrete tumor mass was noted which measured 5 cm. in diameter. The cut surface of the tumor was a pale yellowish brown in color, firm and solid in consistency, and revealed a faint coarse lobulation. Tumor thrombi were found in two large veins near the site of resection. The tumor was sharply circumscribed from the surrounding liver tissue. In the surrounding liver tissue a few other tiny discrete tumor nodules were present, the average measuring 0.3 cm. in diameter.

The anatomic diagnosis was as follows: metastatic carcinoma of the left lobe of the liver; possible sources: granulosa cell tumor, pancreas, malignant bronchial adenoma, etc. The patient was discharged from the hospital on August 24th. A slight biliary fistula persisted. By February, 1954, a rapidly enlarging right hepatic lobe was evident. X-ray therapy was given, with temporary palliation. The liver slowly increased in size and the fistula persisted. Vomiting and pain continued unabated until the patient died on August 24, 1954. Death was attributed to intracranial metastases: There was marked elevation of spinal fluid pressure, choked discs and increased spinal fluid protein. At no time, either at laparotomy, by subsequent diagnostic procedures or during the course of the disease, was the primary site of the cancer evident.

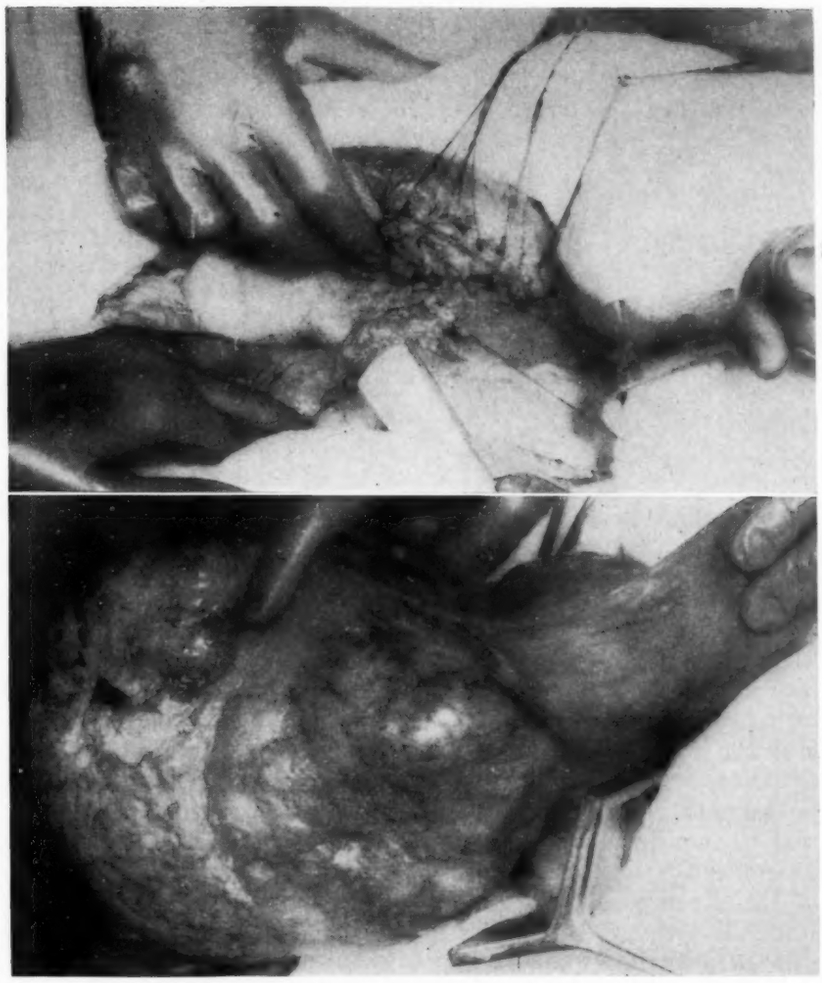


FIG. 8. Case III. Postoperative closure of interlobar septum after total left hepatic lobectomy.

FIG. 9. Same case. Bulky metastatic cancer in left hepatic lobe. Right lobe normal. Exposure through laparothoracotomy.

Sigmoidectomy with Primary Anastomosis and Left Hepatolobectomy in One Stage for Colonic Cancer Metastatic to Liver

CASE IV. H. G., a thirty-five year old white woman, was operated upon elsewhere in 1942 for ulcerating, infiltrating carcinoma of the cecum with lymphatic metastases associated with multiple polyposis of the colon. Five centimeters of terminal ileum and 12 cm. of the cecum and ascending colon were resected and a lateral anastomosis was performed by the surgeon. The diagnosis was anaplastic carcinoma with lymphatic metastasis. In October, 1946, she experienced pain in the right lower abdominal quadrant with a loss of 5 pounds in weight. In January and February, 1947, she received x-ray therapy in the following amounts: to the right anterior pelvis 3,800 r, to the lateral right pelvis 3,600 r, and to the posterior right pelvis 3,600 r. On March 30, 1947, the patient was found to be anemic and cachectic, with a palpable mass beneath the scar of her right hemicolectomy. The patient was reoperated upon by us on April 4th and a recurrent carcinoma the size of a tennis ball was found at the site of anastomosis. At this time another 6 inches of ileum, the remainder of the ascending colon, the hepatic flexure and a large portion of the transverse colon were removed, and an end-to-end anastomosis was performed. The patient had an uneventful convalescence. She did well postoperatively and was followed up carefully every few months until October 12, 1954 (five and a half years later).

The patient returned with severe upper ab-

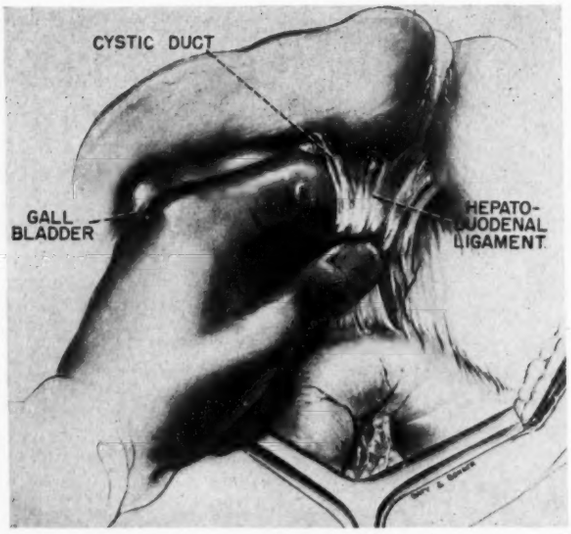


FIG. 10. Temporary occlusion of hepatic artery and portal vein by digital pressure for control of hemorrhage from liver. Fore- and middle fingers within foramen of Winslow.

dominal pain radiating to the back and a loss of 2 pounds in weight. At this time a large tender mass was palpable in the left epigastrium.

On x-ray examination a new tumor was found high in the sigmoid colon. The large liver was considered to contain metastases in the left lobe. On December 15, 1954, at reoperation carcinoma of the sigmoid without perforation of the serosa, but with a group of hard nodes immediately beneath the tumor, was found. The left lobe of the liver contained several huge metastatic foci. Sigmoidectomy with end-to-end anastomosis was performed, and through the extended incision left hepatic lobectomy by the guillotine procedure was accomplished. Pathologic examination showed extremely anaplastic carcinoma of the sigmoid losing all evidence of gland formation penetrating only to the submucosa and not into the muscle. It did, however, penetrate into a vein which contained cancer thrombi. Two sigmoidal lymph nodes contained metastatic cancer. The tumor in the liver duplicated that of the intestine. Within the surgical specimen the portal vein near the periphery had numerous minute foci of intravenous cancer. There was invasion of the sinusoidal bed into the central vein and into the sublobular vein. The diagnosis of carcinoma of the sigmoid with lymphatic and hepatic metastasis, and carcinomatous thrombosis of the portal, central and sublobular hepatic veins was made.

The patient's postoperative course was uneventful except for discomfort in her back which was relieved by spontaneous evacuation of a large accumulation of bile. A metastatic focus in the dome of the right hepatic lobe is suspected.

Total Right Hepatic Lobectomy for Metastatic Colonic Cancer

CASE V. L. S., a thirty-eight year old white woman, noticed a painless lump in the right upper abdominal quadrant two months prior to our examination. There was no weight loss, jaundice, nausea, vomiting or diarrhea. Because of the history of chronic constipation a barium enema was given which revealed a stenosing lesion of the sigmoid colon, interpreted as being carcinoma.

On physical examination the patient was a well developed, well nourished, moderately anemic, early middle-aged white woman. There was no discernible jaundice. The right upper abdominal quadrant was occupied by a firm nodular, slightly tender mass extending to the level of the umbilicus. The left lobe of the liver was not felt.

X-rays of the chest revealed no evidence of metastases. A cholecystogram revealed poor concentration of the dye and multiple small non-opaque biliary calculi. The gallbladder emptied after a high fat meal. A scout film of the abdomen revealed a tremendously enlarged right lobe of the liver occupying the right upper quadrant. A barium enema detected a stenosing lesion at the mid-portion of the sigmoid colon. There was very little passage of the barium past this poi. t. (Table 1.)

On October 25, 1954, anterior resection of the sigmoid colon was performed with an end-to-end anastomosis. Bilateral salpingo-oophorectomy was also performed. The right lobe of the liver at this time was found to be tremendously enlarged, extending down to the umbilicus due to multiple large confluent metastases. There was no free fluid.

On November 10th, sixteen days later, a total right hepatic lobectomy was performed. Six pints of blood were used during the operative procedure. An intercostal tube was placed in the right pleural cavity and connected to an underwater seal. Three Penrose drains were placed in the right hepatic bed.

The postoperative course was uneventful.

TABLE I

LABORATORY STUDIES IN CASE V

Date (1954)	Hemoglobin (gm. %)	White Blood Count (thousands)	Hematocrit (%)	Bilirubin (mg./100 cc.)			Bromsulphalein Retention (%)	Cephalin Flocculation (48 hr.)	Thymol Turbidity (units)	Cholesterol (mg./100 cc.)		Total Protein (gm./100 cc.)	Albumin (gm./100 cc.)	Prothrombin (sec.)	Transaminase (units)	Uric Acid (mg./100 cc.)	Glucose (mg./100 cc.)	Urea Nitrogen (mg./100 cc.)	Calcium (mg./100 cc.)	Chloride (mEq./L.)	CO_2 Content (mEq./L.)	Sodium (mEq./L.)	Alkaline Phosphatase (units)	Inorganic Phosphatase (mg./100 cc.)	Potassium (mEq./L.)
				Total	Dir. 1 min.	Dir. 30 min.				Total	Free														
10/21*	11.5	11.9	36	0.64	....	....	..	Neg.	1.54	...	..	6.9	4.0	15.4	...	...	111	7.6	...	...	..	...	9.3	3.5	....
11/8	12.8	....	37	0.49	0.03	0.17	11	3+	1.86	321	98	....	...	15.6	...	...	...	....	....	...	..	...	18.8	4.1	....
11/9†	....	....	..	....	....	....	..	...	....	...	..	7.3	4.6	....	...	3.8	...	11.2	9.8	103	26	136	20.0	2.6	4.85
11/11	15.4	....	44	6.96	3.16	4.60	..	4+	1.00	186	74	7.1	4.9	17.8	392	...	291	12.5	10.0	97	25	158	11.3	4.8	5.23
11/12	....	....	..	3.70	....	....	..	...	....	...	..	6.3	4.0	19.8	201	...	106	....	...	...	..	...	9.1	3.5	....
11/13	....	....	33	2.58	0.92	1.54	..	...	....	...	..	5.9	3.8	15.4	160	...	139	15.7	9.4	93	26	135	....	...	5.44
11/14	....	....	33	....	....	....	..	...	....	...	..	5.1	3.0	....	112	...	...	....	....	...	..	...	....	...	....
11/15	....	....	36	....	....	....	..	...	....	...	..	5.6	4.0	18.0	96	...	87	11.6	....	99	22	128	....	...	5.00
11/16	11.2	....	35	2.30	0.26	0.61	..	4+	1.44	105	39	5.3	3.4	19.0	92	2.1	172	12.3	9.0	96	24	128	10.0	3.2	3.20
11/17	9.8	16.6	30	....	....	....	..	...	....	...	..	4.7	2.9	....	56	...	...	....	....	...	..	...	....	...	....
11/18	....	....	..	1.68	0.33	0.70	..	4+	1.83	...	..	5.6	3.0	....	40	2.8	...	....	6.2	...	..	...	9.2	2.9	....
11/19	....	....	..	....	....	....	..	...	....	...	..	5.4	2.8	18.1	...	...	126	8.1	....	106	24	130	....	...	2.80
11/20	....	....	..	....	....	....	..	...	....	...	..	10.1	...	....	...	...	...	....	....	103	20	...	....	...	3.72
11/22	....	....	..	....	....	....	..	...	....	...	..	8.0	5.0	16.8	42	...	...	....	9.5	100	26	134	....	...	3.95
11/23	....	....	..	0.73	0.23	0.44	..	4+	1.54	102	39	5.8	3.1	....	...	2.3	...	....	....	...	..	...	....	...	....
11/24	11.5	....	36	....	....	....	..	...	....	...	..	....	...	....	...	...	88	....	....	...	..	...	....	...	....

* First operation, resection of the sigmoid, October 25, 1954.

† Second operation, total right hepatic lobectomy, November 10, 1954.

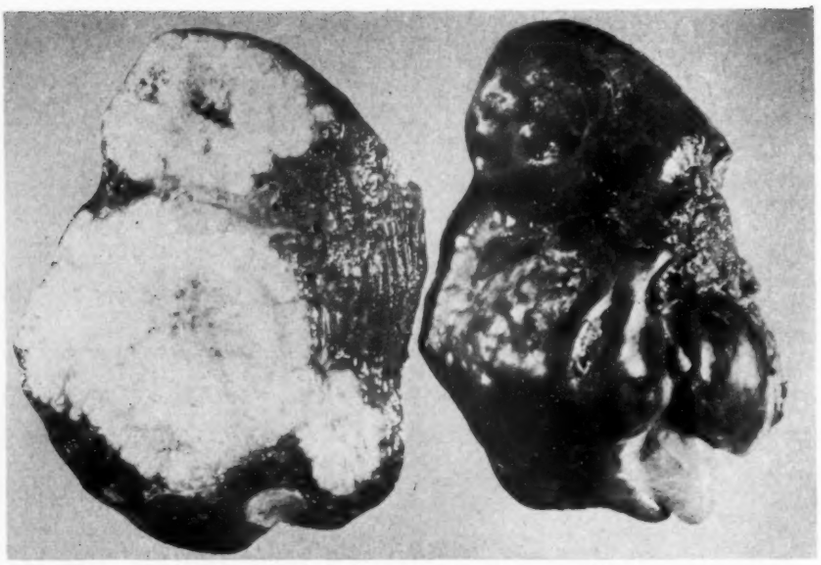


FIG. 11. Case v. Total right hepatic lobectomy for metastatic cancer secondary to primary cancer of the sigmoid previously treated by sigmoidectomy with anastomosis.

The patient was given parenteral fluids for four days. On the fifth day she was eating a soft diet and had a normal bowel movement. Medications consisted of 1 cc. combiotic® every eight hours, 250 mg. terramycin® every six hours, and 100 mg. cortisone per day. The liver function tests improved remarkably during the postoperative period. However, there was a marked drop in the total serum proteins, potassium and calcium. The patient was discharged on the seventeenth postoperative day eating a regular diet, having gained 7 pounds since the operation.

The report of the pathologist was adenocarcinoma, grade III, of the sigmoid colon extending through the entire wall and metastatic to multiple lymph nodes. Metastatic carcinoma was found in both ovaries. The right lobe of the liver contained massive metastatic adenocarcinoma. (Fig. 11.)

At present the patient performs her household duties without discomfort. The left lobe of the liver has enlarged symmetrically across the midline into the right hypochondrium and to the umbilicus. This enlargement is considered to be due to regenerative hyperplasia.

REFERENCES

1. FLOOD, C. A., GUTMAN, E. B. and GUTMAN, A. B. Phosphatase activity, inorganic phosphorus and calcium of serum in disease of liver and biliary tract. *Arch. Int. Med.*, 59: 981–999, 1937.
2. MANN, J. D., WAKIM, K. G. and BAGGENSTOSS, A. H. The vasculature of the human liver: a study by the injection-cast method. *Proc. Staff Meet., Mayo Clin.*, 28: 227–232, 1953.
3. MERANZE, D. R., MERANZE, T. and ROTHMAN, M. M. Serum phosphatase as an aid in the diagnosis of metastasis of cancer of the liver. *Pennsylvania M. J.*, 41: 1160–1164, 1938.
4. PACK, G. T. and BAKER, H. W. Total right hepatic lobectomy. *Ann. Surg.*, 138: 253–258, 1953.
5. PACK, G. T. and MILLER, T. R. The treatment of hepatic tumors. *New York State J. Med.*, 53: 2205–2207, 1953.
6. PACK, G. T., MILLER, T. R. and BRASFIELD, R. D. Total right hepatic lobectomy for cancer of the gallbladder. A report of three cases. *Ann. Surg.*, 142: 6–16, 1955.
7. ROLLESTON, H. D. Diseases of the Liver, Gallbladder and Bile Ducts. London, 1912. Macmillan & Co.
8. SHAY, H. and SIPLET, A. B. The value of serum alkaline phosphatase determination and bromsulphalein test in the diagnosis of metastatic cancer of the liver. *J. Lab. & Clin. Med.*, 43: 741–751, 1954.
9. SPECTER, J. and CHODOFF, R. J. Massive intraperitoneal hemorrhage from carcinoma of the liver. *Surgery*, 27: 457–459, 1950.
10. STIRRET, L. A., YUHL, E. T. and LIBBY, R. L. The hepatic radioactivity survey. *Radiology*, 61: 930–934, 1953.
11. WILLIS, R. A. The importance of venous invasion in the development of metastatic tumors in the liver. *J. Path. & Bact.*, 33: 849–861, 1930.
12. WROBLEWSKI, F. and LADUE, J. S. Serum glutamic oxalacetic transaminase activity as an index of liver cell injury. (In press.)

Morbidity and Mortality Factors in Large Bowel Obstruction

LOUIS R. SLATTERY, M.D. (*By Invitation*) AND PETER J. FERRATO, M.D. (*By Invitation*),
New York, New York

From the Department of Surgery, New York University Post-Graduate Medical School and Fourth Surgical Division (New York University) of Bellevue Hospital, New York, New York.

THE surgical management of large bowel obstruction is accompanied by a high morbidity and mortality in comparison with other types of surgery of the colon. The difficulties in accurate localization of the obstruction and the ease with which technical errors jeopardize the outcome result in disagreement among surgeons concerning the best method of management. In order to evaluate the problem we have reviewed the cases of patients with large bowel obstruction operated upon at the Fourth Surgical Division of Bellevue Hospital. This study comprises eighty-five cases during the fifteen-year period from 1940 through 1954. Patients having partial obstructions relieved by cathartics and enemas are not included. Intubation has not been used in the definitive management of large bowel obstruction.

ETIOLOGY

Primary carcinoma has been the predominant cause of obstruction. It is in this group that the difficult problems and fatalities occur, as will be shown later. Michel[2] and his associates have pointed out that patients with malignant obstruction have been ill for much longer periods than those with other types of obstruction and present a greater operative risk. Malignant obstruction is also accompanied by extreme distention in comparison with other diseases of the colon in which obstruction is not so complete.[1] The extreme distention with the possibility of cecal rupture preoperatively and the danger of contamination during the decompressive procedure, as well as the debilitating effects of malignant disease, seem to be factors in the mortality rate. (Table 1.)

AGE AND GENERAL CONDITION OF PATIENT

Age has not seemed an important factor in mortality, the average age of fatal cases being sixty-five years, while that of the entire group was sixty-two years. Decompressive procedures are short and atraumatic if performed without incident. Two of three patients with severe cardiac disease survived these procedures uneventfully. One was a patient convalescing from a coronary occlusion when obstruction developed due to a carcinoma of the ascending colon. In the second case obstruction developed due to carcinoma of the descending colon while the patient was on medical service for treatment of cardiac decompensation. A third cardiac patient with uremia and oliguria secondary to genitourinary tuberculosis and nephrolithiasis succumbed to her complicating diseases thirteen days after an uneventful cecostomy was performed for carcinoma of the splenic flexure. Only one patient was in a moribund condition at the time of admission. Despite vigorous supportive measures for one day she died ten minutes after cecostomy had been

TABLE 1

Etiology	Cases (No.)	Mortality (No.)
Primary carcinoma	62	10
Diverticulitis	3	..
Volvulus of sigmoid	3	..
Volvulus of cecum	1	..
External hernia	5	..
Segmental colitis	2	..
Lymphogranuloma venereum	1	..
Adhesive band	1	..
Undetermined	2	..
Anastomotic obstruction	5	..
Total	85	10

performed for a sigmoid carcinoma with perforation of the cecum and diffuse peritonitis.

DELAY IN DIAGNOSIS AND THERAPY

Delay has been stressed as a factor in morbidity and mortality by Michel[2] and his associates. Both the patient and his medical advisers share culpability in the delay. No fatalities occurred among the patients operated upon on the day of hospital admission. Four fatalities occurred among the patients operated upon on the first day after admission and six occurred among patients operated upon two or more days after admission.

There were also no fatalities among five patients in whom obstruction developed while they were hospitalized. In one case, obstruction was precipitated by ingestion of barium for gastrointestinal series. Similarly no fatalities occurred among five patients in whom obstruction developed postoperatively following colostomy closure.

The delay of one or more days after admission before operation was performed was apparently due to failure in appreciating the significance of the early physical and roentgenologic signs of obstruction and distention.

A scout film of the abdomen was the principal diagnostic procedure relied upon to establish the presence of obstruction. This has proved a reliable method save for the disadvantage that localization of the point of obstruction by this method is not always accurate. Barium colon enema was not performed with sufficient frequency to evaluate accurately its role in the localization of obstruction. However, inability to fill the distal bowel or retain the contrast media was responsible for misleading information in some of the cases in which it was used.

The crux of the delay problem from the surgeon's standpoint seems to be a prompt decision to operate upon patients with early physical and roentgenologic signs of large bowel obstruction.

TABLE II
OPERATIONS PERFORMED

Type	No.	Deaths	Mortality %
Transverse colostomy	33	4	12
Cecostomy	34	6	17.6
Obstructive resection	5	..	....
Sigmoid colostomy	6	..	....
Right hemicolectomy	1	..	....
Ileocolostomy	1	..	....
Release of hernia	3	..	....
Ileostomy	1	..	....
Division of band	1	..	....
Total	85	10	11.7

TABLE III
COMPARISON OF TRANSVERSE COLOSTOMY AND CECOSTOMY FOR MALIGNANT OBSTRUCTION

	No.	Deaths	Mortality (%)
Transverse colostomy for carcinoma	27	4	14.8
Cecostomy for carcinoma	26	6	23

CECOSTOMY AND TRANSVERSE COLOSTOMY

Since 1940 a general operative policy has been followed employing cecostomy for lesions of the right half of the colon, and transverse colostomy by Wangensteen's[3] method for lesions of the left half of the colon. The final decision however has been left to the operating surgeon's judgment. Table II which enumerates the operative procedures performed in this series indicates a lower mortality for transverse colostomy than cecostomy. This is further emphasized in Table III in which the mortality rate of cecostomy for carcinoma is appreciably higher than that of transverse colostomy. The cecostomy fatalities were in cases in which this procedure was performed for obstructions in the left colon, six of nineteen or almost one-third of the cases terminating fatally. The selection of cecostomy in many cases of left colon obstructions seemed to stem from uncertainty as to the exact site of obstruction. Under this circumstance cecostomy was chosen in favor of transverse colostomy, rather than run the chance of entering the abdomen in close proximity to the growth and being forced to close and perform cecostomy, or performing a stoma adjacent to the growth. Although this series is not large, the fallacy of this reasoning is borne out by the fact that only seven of the fifty-three malignant obstructions treated by decompression were in the right colon. Therefore, there was a maximum of one in seven

chances of having to change plans and decompress by cecostomy if transverse colostomy was selected for all suspected left colon obstructions. In one patient with obstructing carcinoma of the ascending colon a transverse incision in the right upper abdominal quadrant was employed because barium enema seemed to indicate the site of obstruction as the sigmoid. When a collapsed transverse colon was encountered, the incision was closed and cecostomy performed. The other facet of the problem was encountered when a transverse colostomy stoma was in close proximity to a carcinoma of the splenic flexure. Resection of growth and colostomy *en bloc* was carried out without incident.

TABLE IV
CAUSES OF DEATH

Cecostomy:	
Unrelieved obstruction	2
Peritonitis	2
Cardiac and renal failure	1
Shock (moribund preoperatively)	1
Total	6
Transverse colostomy:	
Pulmonary embolism	1
Pneumonia	1
Undetermined (autopsy negative)	1
Undetermined (obstruction relieved)	1
Total	4

In this series cecostomy has proved a much less effectual decompressive procedure than transverse colostomy and one more likely to produce contamination and peritonitis. Table IV shows that five of the six fatalities among patients decompressed by cecostomy were caused by unrelieved obstruction and postoperative peritonitis. The cause of death in the four cases managed by transverse colostomy did not appear due to obstruction or peritonitis in any instance. In two of the cecostomies performed by the tube method the patients expired because of unrelieved obstruction; two other patients undergoing the same operation had partial obstruction although they were sufficiently improved to allow resection later. Contamination due to spill occurred during these procedures, and one of the patients who recovered after a stormy course sloughed out the major portion of his omentum. Exteriorization of a portion of the cecum has proved the safest and most satisfactory method of performing cecostomy. Two cecostomies retracted into the abdominal cavity but were retrieved without complications. Preparation of the distal bowel was poor when patients with left colon lesions were decompressed by cecostomy, there being residual edema, dilatation and retained feces above the site of obstruction. This was in contrast to good deflation and preparation when transverse colostomy was done for lesions of the left colon.

Exploration was not carried out as a routine procedure at the time of decompression. The only operative error attributable to this was the performance of a loop colostomy in the sigmoid under the impression that it was the transverse colon in a case of volvulus of the sigmoid.

OTHER OPERATIVE PROCEDURES

Obstructive resection was carried out in five cases without fatality. Two were performed for perforated carcinomas of the transverse colon and sigmoid respectively, and one for an intussuscepted carcinoma of the sigmoid with gangrene. Another was performed for an obstructed anastomosis developing after a primary resection and anastomosis had been done for the removal of a large dermoid cyst of the left ovary involving the sigmoid in an intense inflammatory reaction. The fifth patient so managed had a gangrenous sigmoid due to volvulus. The inadequacy of obstructive resection as an operation for cancer in the presence of obstruction is attested by prompt local recurrence in two of the three cases so managed. An ileocolectomy with primary anastomosis for carcinoma of the ascending colon was performed without incident, although the patient had originally been scheduled for cecostomy.

Among the other procedures utilized were five sigmoid colostomies for inoperable carcinomas which completely obstructed the lower portion of the rectum. Ileostomy was performed for one patient with right colon obstruction and an incompetent ileocecal valve. Division of an obstructing omental band across the transverse colon was done for a man ninety-four years of age.

Three patients with strangulated hernias required only release of the bowel. One of these patients had bled severely from the strangulated sigmoid but the bowel was found viable at operation. One patient with a strangulated ventral hernia containing non-viable trans-

verse colon was managed by colostomy utilizing the necrotic segment. Transverse colostomy was performed for an obstruction of the sigmoid in an incarcerated interstitial hernia, the hernia being repaired later.

Ileocolostomy was performed in one case of segmental colitis of the right colon, followed by later resection.

SUMMARY AND CONCLUSIONS

1. Malignancy is the most common cause of large bowel obstruction and is associated with the highest mortality rate.

2. The extreme distention and the difficulties in relieving this aseptically seem responsible for the high mortality.

3. Transverse colostomy can be performed with greater safety than cecostomy and provides better decompression for lesions of the left colon.

4. Exteriorization of a portion of the cecum is safer and more effective than cecostomy by the tube method.

5. The higher proportion of left colon lesions causing obstruction seems to justify the routine use of transverse colostomy even if it is not absolutely certain that the lesion is in this part of the colon.

6. Primary resection by obstructive resection or anastomosis can be performed without prohibitive mortality, but does not seem to permit an adequate cancer operation in the presence of obstruction.

REFERENCES

1. Gregg, R. O. Survey of intestinal obstruction. *Surgery*, 33: 506, 1953.
2. Michel, M. L., Thompson, C. T., Reinstine, H. W., Senter, R. R. and Dale, D. B. Acute obstructions of the colon. *Ann. Surg.*, 139: 806, 1954.
3. Wangensteen, O. H. The Therapeutic Problem in Bowel Obstructions, 1st. ed., p. 148. Springfield, Illinois, 1937. Charles C Thomas.

Correction of Rectal Incontinence

TRANSPLANTATION OF THE GRACILIS MUSCLE TO CONSTRUCT A RECTAL SPHINCTER

KENNETH PICKRELL, M.D. (*By Invitation*), NICHOLAS GEORGIADE, M.D. (*By Invitation*), CARTER MAGUIRE, M.D. (*By Invitation*) AND HUGH CRAWFORD, M.D. (*By Invitation*), *Durham, North Carolina*

From the Division of Plastic Surgery, Duke University School of Medicine, Duke Hospital, Durham, North Carolina.

QUITE a number of operations have been designed for plastic repair of the divided sphincter muscle: Izquierdo,[1] Sistrunk,[2] Gobells,[3] Steindl,[4] Hirschman,[5] Knapp,[6] Bistrom[7] and others. The purpose of these operations was to approximate by suture the severed muscle ends which had been divided by injury or operation. In instances of recent injury this can be accomplished, but the majority of cases are seen late and in the meantime the muscle has retracted, atrophied and degenerated into fibrous tissue. Hence, as a result of these changes, these procedures have not been uniformly successful.

A number of operations have been devised and designed to utilize the intact gluteal muscles. Chittenden[8] used bilateral muscle flaps from the glutei which were then sutured anterior to the rectum, thereby suspending it in a hammock of muscle. Bistrom[7] cut a muscle flap, 3 to 5 cm. wide, from each gluteal muscle, and long enough to overlap the anal opening. A hole 2 cm. long was then made in the distal end of each flap in the direction of the fibers. The flaps were overlapped and sutured together. The anus was then pulled through and sutured to the skin. Knapp[6] reported a single case in which a muscle pedicle flap was raised from the transverse perinei superficialis and then rotated to fill the gap in the anal sphincter, which had been severed to remove a fistula.

The accepted procedure for the restoration of anal continence was described by Stone[9] in 1932. (Fig. 1.) This procedure is the operation of choice for the correction of incontinence as it pertains to operative or traumatic origin. The operation was the outgrowth of work which began in 1925 when Stone[10] conceived the idea of using preserved fascia as a subcutaneous purse-string suture about the anal canal, introduced through two small incisions at the anterior and posterior commissures. The incisions were connected with each other by subcutaneous blunt dissection. The strip of fascia was then threaded through the tunnels thus formed, and drawn up snugly and fastened. While this procedure tightened the patulous outlet and gave the feeling of greater perineal firmness, increased power of voluntary contraction was not found. In 1929, Stone[11] revised this operation. Two loops of preserved fascia encircled the anus from opposite directions, the free or open ends were then anchored into the gluteus maximus of the opposite side. The anal outlet was thus enclosed in a ring of fascia which could be tightened by the contractions of the gluteal muscles. (Fig. 1.) In appraising the operation, Stone and McLanahan[12] stressed that before the operation can have any chance of success, the gluteal muscles must be properly innervated and able to contract voluntarily. The individual must possess the intelligence to use the muscles to contract the anal canal, and the patience to practice this contraction frequently. The measure of control given by the operation is voluntary and not automatic as is the normal sphincter mechanism. The authors concluded that in spite of some failures, the majority of patients were benefited. It was noted further that a failure did not make the patient any worse and did not prevent repetition of attempts by the same or other methods.

In 1951, we[13] introduced what we believed to be a new principle in anal reconstructive surgery: the transplantation of the gracilis muscle to construct an anal sphincter. The operation to be described has been used on more than thirty patients, both children and

adults, with almost uniform success. The success of the various operations which have been cited and described depend upon the integrity of the nerve supply to the perineum and its musculature. The gracilis muscle transplant operation permits a favorable prognosis for the restoration of anal incontinence even though the nerve supply is not intact. A brief review of the anatomy of the perineum is, therefore, in order.

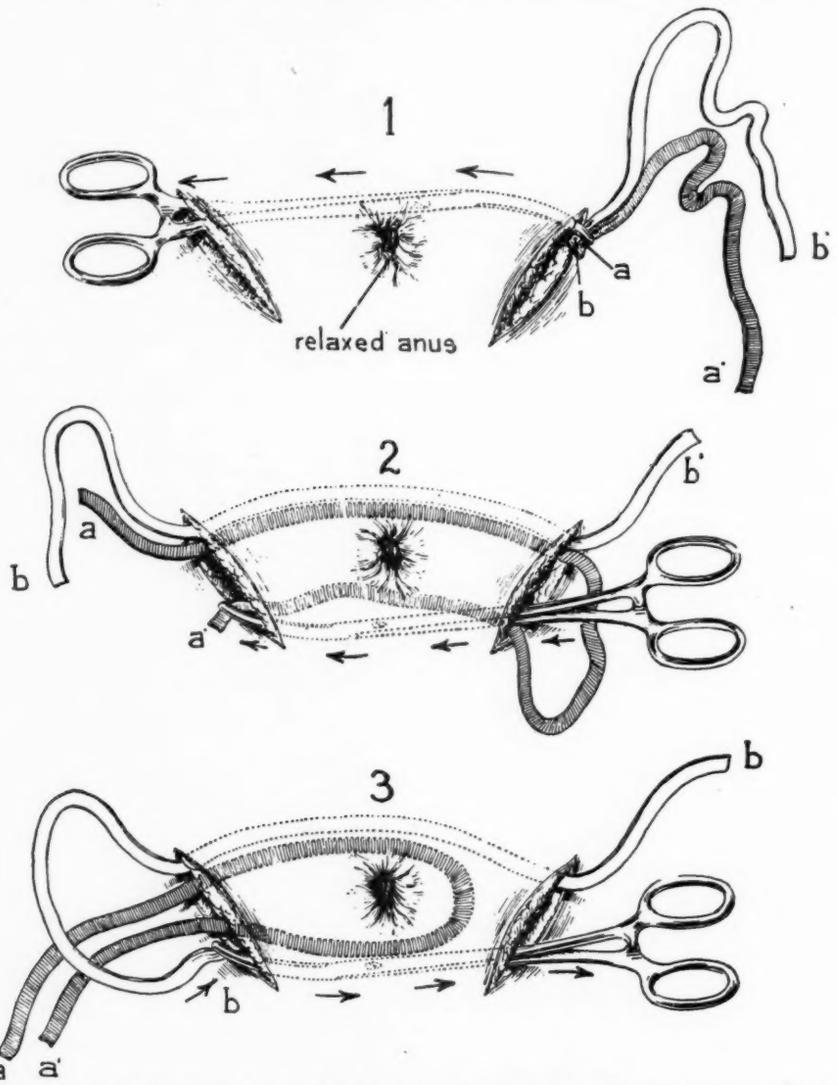


FIG. 1. Steps in the Stone operation for incontinence.[9,10] (1) Clamps are passed subcutaneously in front of and posterior to the anus, grasping the strips of preserved fascia, *a-a'*, *b-b'*. (2) Both strips are passed in front of the anus and one posteriorly. (3) The loops of fascia encircle the anus subcutaneously in opposite directions, and are anchored into the glutei.

ANATOMY

Nerves. The pelvic parasympathetic nerves have their origin in the second, third and fourth sacral segments and pass by way of the cauda equina through the primary divisions of the corresponding sacral nerves to appear in the pelvis as the pelvic nerves, which join the hypogastric plexus before being distributed to the bladder and rectum. The most consistent branches arise from the third and fourth sacral nerves. These fibers are made up of preganglionic efferent and afferent fibers of the parasympathetic division of the autonomic nervous system. The internal pudendal nerves are bilateral somatic fibers which take origin from the anterior primary divisions of the third and fourth sacral nerves. They leave the pelvis

through the lesser sciatic notch and run forward in Alcock's canal to supply the perineum. They give motor innervation to the external sphincter of the bladder, to all the superficial perineal muscles and to the levator ani. Integrity of the internal pudendal nerves may be determined on the motor side by the voluntary activity of the external anal sphincter and the bulbocavernosus muscle. The inferior hemorrhoidal branches follow a pattern similar to that of the vascular arbor and provide innervation through each of four sectors to include the entire circumference of the anus. The continuity is determined chiefly by the sensation in the saddle area of the perineum. Since the innervation is essentially the same, the activity of the external sphincter of the rectum and anus parallels that of the external sphincter of the bladder.

Blood supply to the anterior two-thirds of the sphincter and anal outlet is derived from the perineal artery, a branch of the internal pudendal which anastomoses above with the middle hemorrhoidal artery. The posterior one-third receives its blood supply from the inferior hemorrhoidal artery.

The external anal sphincter is subcutaneous and is attached, in general, anteriorly to the perineal muscles and posteriorly to the coccyx, and is divided into superficial and deep lamina. The muscle fibers may extend anteriorly and posteriorly on each side of the anus inserting into the perineal body; or, they may encircle the anal orifice either anteriorly or posteriorly or both, and function from a relatively fixed point, such as the coccyx or central tendon of the perineum, depending upon the completeness of the anal circumference which they encompass. It is seen from this that the external sphincter does not possess a fixed anatomic pattern, but that small bundles of muscle fibers find their way by diverse routes to variable fixed points in the perineum to exert their action.

The gracilis muscle is the most superficial muscle on the medial side of the thigh. It is broad above, narrow and tapering below. It arises from the anterior margins of the lower half of the pubic symphysis and the upper half of the pubic arch. The fibers run vertically downward and end in a rounded tendon which passes beneath the medial condyle of the femur, then curves around the medial condyle of the tibia, where it becomes flattened and inserts in dovetail fashion into the medial surface of the body of the tibia, below the condyle. The gracilis adducts the thigh, flexes the thigh and rotates it inward. Its nerve supply is derived from the obturator (L2, L3, L4) which enters the upper third of the muscle as a main trunk and usually three branches. On occasion, additional accessory branches enter at a lower level Since the blood vessels from the profunda femoris enter the muscle at a high level as a neurovascular bundle, transplantation is facilitated and without endangering its vitality or function.

GRACILIS MUSCLE TRANSPLANT

Preparation and Preoperative Studies. Preparation begins several days prior to operation with a high colonic flushing. Roentgenograms of the chest, abdomen, lumbar vertebrae, sacrum and pelvis are obtained to confirm or rule out structural abnormalities. A barium enema is obtained, and this is followed by a repeat flushing to empty the colon. The patient is placed on a low residue diet. The preoperative use of antibiotic agents, intestinal and urinary tract antiseptics is empiric and must be individualized. Neomycin is a quick-acting intestinal antiseptic, but it may cause diarrhea.

The urologic consultant will advise the type of catheter, if any, to be inserted into the bladder. Both legs and thighs, the perineum, lower abdomen and buttocks are prepared as a sterile field. With the legs abducted widely, the origin of the gracilis muscle can be palpated just medial to the tendon of the adductor longus along the upper inner aspect of the thigh. An incision approximately 5 cm. in length is made parallel to and along the upper fourth of the muscle. (Fig. 2B.) Using finger and blunt scissors dissection to form a subcutaneous tunnel, the upper third of the gracilis is mobilized through this last incision, using extreme care to avoid injury to the neurovascular bundle which enters from the lateral side.

A second incision approximately 5 cm. in length is made parallel with the long axis of the muscle over its lower third and just above the knee. (Fig. 2B.) At this point the gracilis will be identified as an oval tendon just posterior to the tendon of the sartorius. The tendinous portion of the gracilis is identified and then freed by blunt dissection inferiorly as it

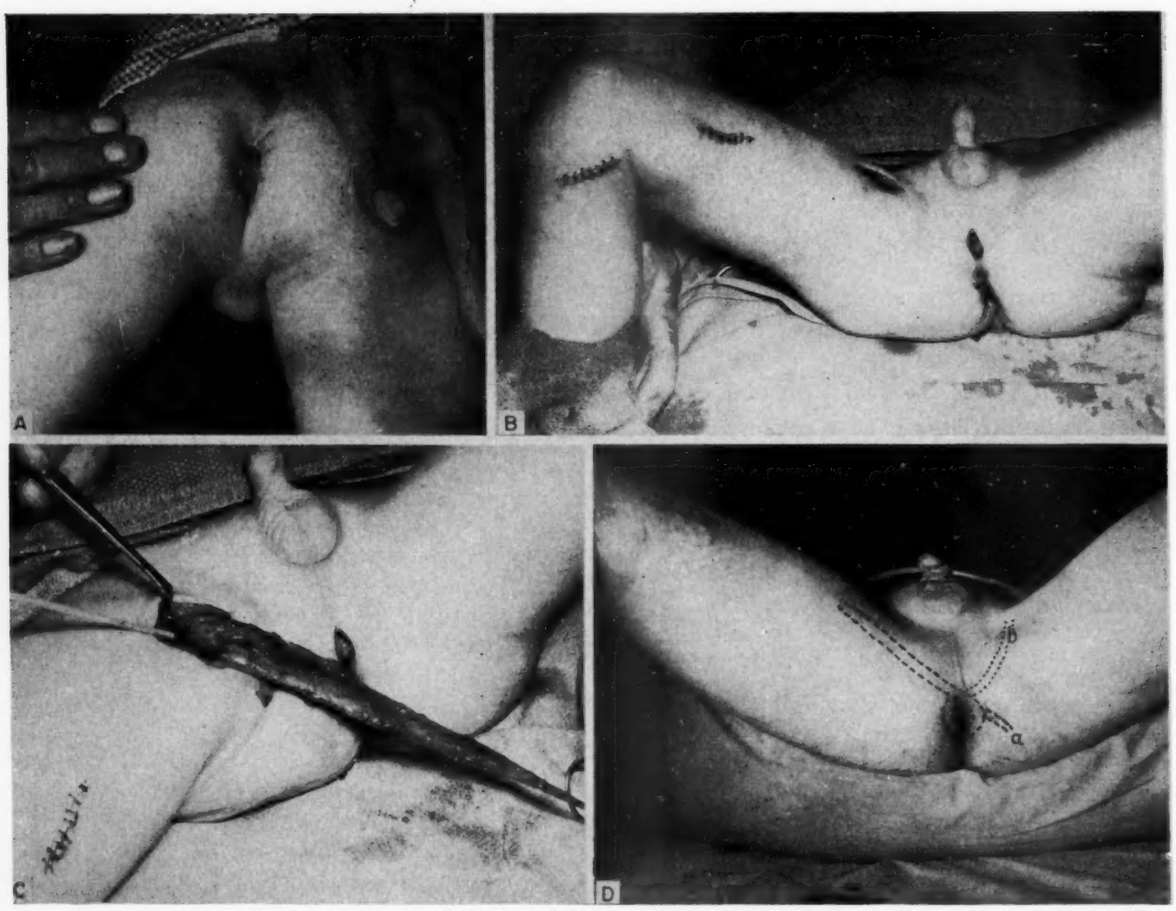


FIG. 2. A, the anal orifice is patulous and the rectal mucosa may prolapse because of the absence of muscular support of the perineal floor. B, the incisions in the thigh and leg are shown through which the gracilis muscle is mobilized. Perineal incisions are made at the 12 and 6 o'clock position. Subcutaneous tunnels connect all incisions. C, the gracilis muscle is broad above, and narrow and tapering below. An applicator stick points to the neurovascular bundle which enters from the lateral side. D, the tendinoperiosteal end of the gracilis is anchored on the opposite side to the periosteum overlying the tuberosity of the ischium (*a*), or to the adductor tendon or the lacunar ligament (*b*).

passes behind the medial condyle of the femur and curves around the medial condyle of the tibia. This part of the dissection is "blind"; however, atraumatic freeing of the tendon is facilitated by adducting the thigh and flexing the lower leg slightly.

A third incision approximately 5 cm. in length is made in an oblique direction along the upper and medial aspects of the tibia, where the tendon of the gracilis becomes flattened and inserts into the body of the tibia below the condyle in dovetail fashion. (Fig. 2B.) Traction of the muscle through the incision in the lower thigh will identify the termination of the gracilis as it inserts into the tibia just below the sartorius. This incision should be adequate, and enlarged if necessary, to expose the termination of the gracilis so that the entire fish-tail insertion can be preserved with its attached periosteum. Care and attention to this detail will facilitate the anchoring of this tendinoperiosteal end of the gracilis either into the periosteum overlying the tuberosity of the ischium or into the adductor tendon of the opposite side.

Perineal Incisions. The legs and thighs are flexed and placed in an exaggerated lithotomy position. A small incision is then made in the anterior and posterior commissure at the 12 and 6 o'clock position beginning about 1.5 cm. from the mucocutaneous junction. (Fig. 2B.) As the incisions are deepened on each side of the raphe, care should be exercised to avoid injury to them, for if they can be preserved and if they are of good quality, the raphe will be used as pulleys just a bit later. A subcutane-

ous tunnel is then made around the anus, using blunt scissors or a curved clamp. A tunnel is then made to connect the incision at the 12 o'clock position with the highest incision in the thigh. The tunnels should be of sufficient size not only to admit the muscle, but also to allow it to move and glide freely. To make sure that the tunnels are of sufficient size, two fingers should be admitted freely. The gracilis muscle is then threaded through the thigh to the perineum tunnel and beneath the anterior raphe, if it has been possible or feasible to construct a pulley here. As the muscle is placed under tension, the neurovascular bundle will be seen to enter from the deep lateral aspect of the origin of the gracilis. (Fig. 2C.) If it is not seen, then the muscle has not been mobilized quite high enough. The tendon and muscle are then threaded around the anus in a clockwise direction to make a complete circle. (Fig. 2D.) The tendon is passed beneath the raphe or pulley at the 6 o'clock position, if one has been formed. When the muscle is large and bulky, there is not sufficient space beneath the raphe at the 12 o'clock position to admit the tendon a second time. When this occurs, the tendon is passed beneath the original or proximal end of the muscle.

Anchoring the Gracilis. The tendinoperiosteal end of the gracilis may be anchored either to the periosteum of the ischium and levator ani muscle on the opposite side (Fig. 2D,*a*), or it may be anchored more easily into the fixed tendinous origin of the adductor longus or the medial aspect of the inguinal ligament (Poupart), the lacunar ligament (Gimbernat). (Fig. 2D,*b*.) It is of importance to remember that the tendon is always anchored on the opposite side to maintain the central position of the anal orifice and to prevent it from being pulled off-sides. If the patient is slender and thin, anchorage of the tendon to the levator ani and periosteum of the tuberosity of the ischium is quite easy; however, if the patient is heavy or obese, it is better to anchor the tendon to the inguinal ligament or the adductor tendon. If it has been decided upon to anchor the tendon to the tuberosity of the ischium, an incision is made directly over the tuberosity at approximately the 3 to 4 o'clock position, on the side opposite the muscle transplant. The tuberosity of the ischium is exposed and a periosteal flap or pulley is elevated from the tuberosity itself. A pulley is also made from the levator ani. The dovetail tendinoperiosteal insertion of the gracilis is then split for 1 cm. or more. One-half of the dovetail is then anchored with sutures of silk either beneath or into the periosteal flap over the prominence of the ischium, while the remaining half is anchored securely to a pulley of levator ani.

When the patient is heavy or obese, it is somewhat easier to anchor the tendon end to the medial end of the inguinal ligament, the lacunar ligament, or the fixed heavy portion of the adductor longus tendon (Fig. 2D,*b*), in the following manner: An incision approximately 5 cm. in length is made just below the fold of the groin, over the medial end of the inguinal or lacunar ligaments. The incision is deepened to expose the ligament just lateral to the pubic tubercle, as the spermatic cord in the male is retracted superiorly. By retracting the inferior skin edge downward, the adductor longus tendon is exposed. A subcutaneous tunnel is then formed by finger or blunt scissors or clamp dissection to connect this incision in the groin with the incision at the 12 o'clock position in the perineum. A pulley or tunnel is made beneath the lacunar or adductor tendon. The tendon end of the gracilis is then pulled through the subcutaneous tunnel into the groin, then beneath and over the pulley of the lacunar ligament or the tendon of the adductor. The tendon end of the gracilis is then anchored securely to both itself and the lacunar ligament using sutures of silk.

The final insertion of the muscle is not decided upon nor fixed until the legs have been brought down into line with the body, then adducted and abducted to make absolutely sure that the anus is tight and very snug. When attempting to insert the finger, over which a second glove has been placed, a cervix-like barrier should be encountered. Otherwise, the muscle has not been tightened sufficiently. Again we want to emphasize that it is of importance to note that the muscle is anchored on the opposite or contralateral side; that is, if the right gracilis is transplanted, it is anchored on the left; if the left gracilis is transplanted, it is anchored on the right. Thereby the central position of the anus is maintained.

All operative incisions are closed without drains, in layers, using sutures of silk. A snug compression dressing is applied to the thigh to prevent formation of a hematoma; however, no perineal dressings are used.

COMMENTS

Incontinence in adults, excluding those patients with congenital or traumatic abnormalities of the spinal column and cord, in most instances is due to trauma resulting from childbirth, operations or injuries; or the result of radiation or the injection of sclerosing solutions. There may be many causes which are responsible for impaired sphincter action resulting in partial or total incontinence.

The procedure which we have just described is applicable to many types of incontinence, both in children and in adults, and it is not dependent upon the continuity or integrity of the nerve supply or the musculature of the perineum.

Exclusive of traumatic lesions, incontinence in children is most frequently due to spina bifida, meningocele or to some congenital malformation involving the second, third and fourth sacral segments which supply and control the rectum and anus. Animal experiments and clinical studies have localized the reflex activity of both micturition and defecation to these sacral segments; hence destruction or interruption of the sacral segments or the cauda equina results in loss of sensation of both the bladder and rectum, and incontinence results. Incontinence of both urine and feces is the rule, unless the patient, child or adult, can be taught to evacuate the bladder every two hours or less, by straining and manual pressure so that the bladder can be emptied to a degree sufficient so that actually he is not incontinent of urine. Unfortunately, however, there is no comparable training program or mechanism for the rectum.

When the rectum is plugged for twenty-four to forty-eight hours, a definite sensation of abdominal fullness and distention is felt. While the innervation of the colon is not understood clearly, it is thought that distention stimuli travel in segmental nerves in the peritoneum, and by afferent fibers through the mesentery from the lower thoracic and upper lumbar nerves without involvement of sympathetic or parasympathetic pathways. While the mode of transmission of these stimuli is of physiologic and academic importance, that they are present and occur is of extreme importance in the present consideration, for our patients, even with complete perineal anesthesia, can readily feel and tell when the sigmoid and colon are distended. The pain of spasm also occurs and is readily recognizable. It is upon the perception and recognition of these sensations that the success of the operation and the maintenance of rectal continence depend. While the gracilis muscle transplant supports the perineal floor and constricts the anal opening, true automatic function is not present; even though control exists, it is not entirely automatic, but rather voluntary. That is, the sphincter is always tight, except when it is relaxed purposefully and voluntarily.

CONCLUSIONS

An operation has been described for the construction of a rectal sphincter by transplanting the gracilis muscle for the restoration of anal continence.

This operation has been performed on more than thirty patients, both children and adults, ranging from three to seventy-two years of age, with uniform degree of success.

REFERENCES

1. Izquierdo, J. Artificial anal sphincter. *Deutsche med. Wchnschr.*, 52: 795, 1926.
2. Sistrunk, W. Plastic surgery operation for extensive laceration of anal sphincter. *Ann. Surg.*, 85: 185, 1927.
3. Gobells, R. Method of forming new anal sphincter. *Arch. f. klin. Chir.*, 148: 612, 1927.
4. Steindl, H. Surgery—in relation to continence. *Wien. med. Wchnschr.*, 79: 1516, 1538, 1929.
5. Hirschman, L. J. Establishment of continent anal sphincter by pediculated innervated myoplasty. *Tr. Am. Proct. Soc.*, 36: 178, 1935.
6. Knapp, L. S. Plastic repair for postoperative repair of anal incontinence. *Ann. Surg.*, 109: 146, 1939.
7. Bistrom, O. Plasticher Ersatz des M. Sphincter Ani. *Acta chir. Scandinav.*, 90: 431, 1944.
8. Chittenden, A. S. Sphincter muscle reconstruction. *Ann. Surg.*, 92: 152, 1930.
9. Stone, H. B. Plastic operation for anal incontinence. *Arch. Surg.*, 24: 120, 1932.
10. Stone, H. B. Plastic operation for anal incontinence. *Arch. Surg.*, 18: 845, 1929.
11. Stone, H. B. Plastic operation to restore voluntary anal control. *J. A. M. A.*, 97: 1205, 1931.
12. Stone, H. B. and McLanahan, S. Results with fascia plastic operation for anal incontinence. *Ann. Surg.*, 114: 73, 1941.
13. Pickrell, K., Broadbent, T. R., Masters, F. W. and Metzger, J. T. Construction of a rectal sphincter and restoration of anal continence by transplanting the gracilis muscle. *Ann. Surg.*, 135: 853, 1952.
14. Pickrell, K., Masters, F., Georgiade, N. and Horton, C. Rectal sphincter reconstruction using gracilis muscle transplant. *Plast. & Reconstruct. Surg.*, 13: 46, 1954.

Epidermoid Carcinoma of the Anal Region

INGUINAL METASTASES

MAUS W. STEARNS, JR., M.D., *New York, New York*

From the Rectum and Colon Service, Memorial Center for Cancer and Allied Diseases, New York, New York.

ALTHOUGH a considerable amount of literature has accumulated pertaining to epidermoid carcinoma of the anal region, relatively little data have been presented concerning the management of inguinal node metastases occurring in patients with this neoplasm.[3,4,6,7]

The tendency of squamous carcinoma in this location to metastasize to the inguinal lymph nodes is well recognized. Frequencies of 8 to 33 per cent have been reported.[2,4,5] The opinion has been expressed that inguinal metastases are not amenable to cure either by surgery or by radiation although they may be prevented by surgery.[5] The high incidence of inguinal metastases and the poor prognosis associated with their presence has led several authors[1,2,7] to advocate that "prophylactic" groin dissections be performed as a part of the ideal treatment. Opposed to the theoretic advantage of bilateral prophylactic groin dissection is the not inconsiderable morbidity associated with this procedure. This morbidity is due initially to poor wound healing and subsequently to lymphedema of the lower extremity. Occasionally the lymphedema is severe enough to incapacitate a patient permanently.

Final evaluation of "prophylactic" groin dissection must await publication of results obtained by its proponents. In the meantime, it seems of value to analyze the data we now have in regard to these metastases.

MATERIAL

This review concerns sixty-nine patients with epidermoid carcinoma of the perianal skin, anal canal and rectum who were admitted either as in- or outpatients to the Rectum and Colon Service of the Memorial Center for Cancer and Allied Diseases from January, 1942, to December, 1952.

Some of these patients had had definitive therapy prior to coming to Memorial Hospital. Some were seen when their neoplasm was beyond hope of cure. The therapy rendered at Memorial Hospital was modified by these conditions and did not always represent ideal treatment.

The primary neoplasms were treated by a variety of methods, primarily surgery with or without irradiation in the pre- or postoperative stage. The surgical procedure varied from local excision for relatively small perianal lesions to combined abdominoperineal resection of the rectum accompanied by a meticulous abdominopelvic node dissection.

The combined abdominoperineal resection of the rectum which is routine in this clinic for this neoplasm stresses ligation of the superior hemorrhoidal vessels just below the left colic artery, wide removal of the peritoneum, wide perineal skin excision with complete removal of the ischiorectal fossa contents, and division of the levator muscles at their origin.

The abdominopelvic node dissection includes removal of the tissue from about the aorta, vena cava, the iliacs (common, external and internal), the obturator space, the presacral and aortic bifurcation. Tissues from these individual areas are labeled and sent as separate specimens in order that the exact sites of node metastases may be identified.

All of the groin dissections studied in this review were performed in the presence of clinically diagnosed groin metastases. Generally, prior to dissection the presence of node metastases was proved by aspiration biopsy or occasionally by local excision.

Groin dissections in this group of patients are classified as superficial or radical. The former dissection is limited to the inguinal area (upper thigh and lower abdomen) superficial to the fascia of the abdominal wall and the femoral area. The radical dissection in addition includes the tissues from about the external and internal iliac vessels and obturator fossa.

Inasmuch as the purpose of the present study is to add to our understanding of the problems of groin metastases from epidermoid carcinoma of the anal region, the analysis of end results and the method of treatment of the primary lesion are considered only in relation to this purpose.

TABLE I
AGE OF PATIENT IN YEARS

Groin Metastases	20–29	30–39	40–49	50–59	60–69	70–79	80–89
No.	0	0	7	7	18	5	3
Yes	1	1	7	7	10	2	1

TABLE II
SEX OF PATIENT

Groin Metastases	No. of Men	No. of Women
No	14	26
Yes	12	17

TABLE III
DURATION OF SYMPTOMS

Groin Metastases	Less than 3 mo.	3–6 mo.	6–12 mo.	1–2 yr.	Over 2 yr.	Not Stated
No	12	2	11	10	1	4
Yes	6	7	6	5	4	1

Incidence of Groin Node Metastases. Of the sixty-nine patients studied who had epidermoid carcinoma of the perianal skin, anal canal or distal rectum, forty failed to present groin metastases either initially or subsequently. Of the forty patients, seventeen were followed up less than two years, and twenty-three were followed up more than two years. Twenty-nine patients or 42 per cent did have groin metastases. Of the twenty-nine, sixteen had clinically diagnosed groin metastases on admission, and in thirteen groin metastases became clinically recognizable after the treatment of the primary neoplasm had been completed. Of the thirteen that developed subsequently, eleven appeared within two years, two after two years (one at nine years).

Clinical Factors and Incidence of Groin Node Metastases. Tables I to V show the relation of the age and sex of the patient, duration of symptoms prior to treatment, and the location and grade of the tumor to the development of groin metastases. Obviously the number of patients is too small for statistical significance,

TABLE IV
LOCATION OF PRIMARY TUMOR

Groin Metastases	Perianal	Perianal and Anal	Anal Canal	Anal and Rectum	Rectum	Perianal, Anal and Rectum
No	2	9	14	9	5	1
Yes	3	7	8	7	0	4

TABLE V
GRADE OF TUMOR HISTOLOGICALLY

Groin Metastases	Grade I	Grade II	Grade III	Not Graded
No	2	18	14	5
Yes	3	10	11	6

TABLE VI
THERAPY OF PRIMARY LESION

Subsequent Groin Metastases	Radiation Only	Surgery Only	Radiation and Surgery
No	11	13	15
Yes	3	6	4

but there does not appear to be any definite relation between any of these factors and the presence of groin metastases.

In Table VI the relationship between the type of therapy for the primary tumor and the subsequent appearance of groin metastases is presented. Again the numbers in each group are few but no appreciable difference is noted.

Table VII indicates the type of surgery and subsequent groin metastases. Again no appreciable difference is noted.

Sites of Lymphatic Metastases. Information concerning the lymphatic metastases from this form of cancer was obtained by a study of the

operative specimens and is summarized in Table VIII. It may be assumed that the specimens, grouped here according to the type of surgical procedure, included the following tissues: (1) by "perineal resection" a wide local resection of the primary with immediately adjacent regional lymph nodes; (2) by the standard Miles procedure all of the lymphatics along the superior hemorrhoidal chain up to the left colic vessels, those along the middle hemorrhoidal out to but not including the hypogastrics, and all nodes adjacent to the levator muscles and those in the ischiorectal fossa; (3) by combined abdominoperineal resection with added abdominopelvic node dissection, in addition to the aforementioned lymphatics, those about the aorta and vena cava up to the third portion of the duodenum, the sacral promontory and aortic bifurcation, the common, external and internal iliacs, and in the obturator spaces bilaterally.

TABLE VII
TYPE OF SURGERY

Subsequent Groin Metastases	Local Excision Only Treatment for 3 mo.	Colostomy and Perineal Resection	Abdominoperineal Resection	Local Excision Followed by Abdominoperineal Resection after 3 mo.
No.....	13	5	14	2
Yes.....	4	0	6	2

TABLE VIII
SITES OF LYMPHATIC METASTASES

Procedure	No.	Superior Hemorrhoidal Chain		Deep Pelvic (Iliacs, Obturator)	
		Negative	Positive	Negative	Positive
Perineal resection.....	4	4	0	..	..
Abdominoperineal resection.	16	15	1	1*	3*
Abdominoperineal resection plus pelvic node dissection.	12	8	4	8	4

* These were found in radical groin dissections.

It should be noted at this time that none of the specimens showed metastases to the nodes at the sacral promontory or aortic bifurcation nor to any nodes located along the levator muscles or in the ischiorectal fossa although direct extension was noted. To summarize Table VIII, of thirty-three superior hemorrhoidal lymphatic chains studied, five or 15 per cent showed lymphatic metastases; of sixteen pelvic lymphadenectomies performed (external and internal iliacs and obturator space), seven or 43 per cent showed metastases.

TABLE IX
LOCATION OF PRIMARY LESION AND SITES OF NODE METASTASES

Location of Primary Lesion	Total No.	Superior Hemorrhoidal		Deep Pelvic (Iliacs, Obturator)		Superficial Groin	
		Negative	Positive	Negative	Positive	Negative	Positive
Perianal...	5	..	..	2	2	1	3
Perianal and anal.	16	4	..	2	..	..	3
Anal.....	22	11	3	6	2	2	7
Anal and rectal....	16	8	2	4	2	1	4
Rectal.....	5	1	1	..	..	..	..
Extensive..	5	2	1	..	2	..	2

The location of the primary tumor as related to the sites of lymphatic metastases is presented in Table IX, which when interpreted in conjunction with the analysis of individual specimens indicates confirmation of described routes of lymphatic drainage based primarily on anatomic studies.[1,5]

One route described is from the anal plexus through the perineal lymphatics up over the upper thigh emptying first into the superficial groin nodes. Presumably, metastases to the deep pelvic nodes may occur from the superficial nodes. This route most satisfactorily explains the distribution of inguinal and pelvic metastases in the following patients: Two patients had tumors confined to the perianal skin with inguinal metastases. In one the metastases were confined to superficial nodes while in the other external iliac and obturator node metastases were present, also. Two patients with primary lesions involving both the perianal skin and the anal canal had superficial groin metastases without deep pelvic node involvement. Six patients with lesions confined to the anal canal had superficial groin metastases with negative deep pelvic nodes. Four patients with lesions involving the upper anal canal and distal rectum had superficial groin metastases with negative deep pelvic nodes.

Another route is described as following the middle hemorrhoidal plexus to the hypogastrics, obturators and then to the external iliacs

and superficial inguinal nodes. This route would explain the following distribution: Two patients whose tumors were confined to the anal canal and two patients whose primary lesion involved both the anal canal and rectum

TABLE X
OVER-ALL SURVIVAL

Cases	Three Years		Five Years	
	No.	%	No.	%
Without groin metastases:				
Indeterminate*	11	....	18	....
Failures	10	....	11	....
Successes	19	65.5	11	50.0
With groin metastases:				
Indeterminate*	4	....	5	....
Failures	21	....	21	....
Successes	4	16.0	3	12.5

* Indeterminate cases are those patients who were lost track of, who died of other causes without signs of recurrent cancer, or who were treated relatively recently and could not be observed for the designated period.

presented negative superficial nodes with metastases to the deep pelvic nodes.

In this series no deep pelvic node dissections were performed for perianal lesions unless superficial groin metastases were present. Therefore we cannot state that the patients did not have deep pelvic nodes without superficial metastases.

RESULTS

The comparative three- and five-year survival rates of patients with and without groin node metastases are shown in Table x. Thus the three-year survival of those without groin metastases was 65.5 per cent as compared with 16 per cent for those with inguinal spread. Similarly, the five-year survival for those without was 50 per cent as compared to 12.5 per cent for those with groin metastases.

Table XI is a summary of those patients presenting inguinal node metastases on admission. Nine underwent groin dissection either at the time of the treatment of the primary neoplasm or within a few weeks. All patients died as a result of their disease although two lived more than five years.

Table XII summarizes the results obtained in the thirteen patients in whom clinically recognizable groin metastases were not present on admission but did appear subsequently. Of the thirteen patients, eight underwent groin dissection when the metastases became recognizable clinically. Of the eight, two died of

TABLE XI
GROIN METASTASES PRESENT ON ADMISSION

Treatment	Result	No.	Duration
None	Failure	6	Less than 2 yr.
X-ray	Failure	1	4 mo.
Groin dissection	Failure	7	Less than 3 yr.
		2	Over 5 yr.

TABLE XII
NO GROIN METASTASES ON ADMISSION BUT APPEARED SUBSEQUENTLY

Treatment	Result	No.	Duration
None	Failure	2	Less than 6 mo.
X-ray	Failure	1	Less than 6 mo.
Local excision	Failure	2	Less than 3 yr.
Groin dissection	Indeterminate	1*	Between 2–3 yr.
	Failure	2	Less than 1 yr.
	Success	1	Between 1–2 yr.
	Success	2	Between 2–3 yr.
	Success	1	Between 4–5 yr.
	Success	1	Between 6–7 yr.

* Died of other cause without evidence of recurrent or metastatic carcinoma.

disease, one died of other causes without recurrent or metastatic disease thirty months after groin dissection, and five are living free of recurrence two to six years. The remaining five had no curative therapy for the groin metastases, four because the primary was not controlled and the fifth because the metastases were too bulky for complete removal.

It could not be shown that either the age of the patients or the location of the primary tumor bore any relation to the outcome of therapeutic groin dissection.

The results obtained by excising pelvic lymph nodes containing metastatic carcinoma may be summarized as follows: Twelve patients underwent abdominopelvic node dissections added to abdominoperineal resection of the rectum as part of the original treatment of the primary tumor. Four of these had metastases to the iliac or obturator nodes. None lived more than three years. Five patients who underwent radical groin dissection had iliac or obturator node metastases in addition to the superficial groin involvement. Four

of the five patients have been free of recurrence two to six years.

COMMENTS

Until more information is available, the foregoing data may be used as a basis for the clinical approach to several of the problems presented in the consideration of proper management of inguinal metastases from epidermoid carcinoma of the anal canal.

The first problem is to determine whether "prophylactic" groin dissection would have been of value in this group of patients. There were fifty-three patients who did not present clinically recognizable inguinal metastases at the time the primary lesion was treated. Inasmuch as there is no definite relationship between the location of the primary lesion and the side to which metastases occur, fifty-three bilateral groin dissections would have been performed prophylactically. Forty of this group failed to develop groin metastases, while thirteen or 25 per cent did. In the thirteen, the primary was uncontrolled in four, leaving nine patients in whom prophylactic groin dissection might have been of value. Actually, of the nine there were only three failures due to cancer. Thus fifty-three bilateral groin dissections would have been performed for the possible salvage of three patients or 6.0 per cent.

The results of therapeutic groin dissection seem paradoxic in that none of the nine dissections performed as a part of the initial treatment resulted in cure of the patient, while six of eight performed for metastases appearing subsequently apparently were effective in controlling the disease. A study of the value of excision of deep pelvic node metastases is also inconclusive, as all four patients died in whom iliac or obturator node metastases were removed along with the primary neoplasm, whereas four of five patients who had iliac or obturator node metastases removed as part of subsequent radical groin dissection are living free of cancer. It may be that malignant spread to the nodes early as shown by their presence at the time the primary lesion is first treated indicates a more virulent type of cancer than when metastases appear subsequently. However, much more clinical data are necessary before any such conclusion can be drawn.

Based on the foregoing considerations, the management of groin metastases followed by the Rectum and Colon Service at Memorial Hospital may be briefly summarized as follows: Perianal lesions or small and superficial lesions very low in the anal canal are treated by wide local excision. The groin nodes are then observed at monthly or bimonthly intervals for the first two years, at three- or four-month intervals up to five years, and at yearly intervals thereafter. When and if groin metastases appear, radical groin dissection is performed on the involved side. For more extensive perianal lesions involving the anal canal and for those in other locations, the primary lesion is treated by abdominoperineal resection of the rectum with meticulous abdominopelvic node dissection up to the inguinal ligament. The superficial inguinal nodes are observed carefully at frequent intervals; and if and when they appear clinically to be diseased, superficial groin dissection is then performed.

SUMMARY

1. Sixty-nine cases of epidermoid carcinoma of the anal region seen at Memorial Center between January, 1942, and December, 1952, have been reviewed.

2. Forty of the sixty-nine patients did not present clinically recognizable groin metastases. Twenty-nine or 42 per cent did show metastases to this location.

3. Sixteen of the twenty-nine patients had obvious groin metastases at the time of admission. Of the thirteen that appeared subsequently, eleven or 85 per cent appeared within the first two years of observation.

4. The study of surgical specimens in this series tends to confirm two routes of spread from the anal region: (a) by the way of the perianal lymphatics or upper thigh directly to the superficial groin nodes, then to the iliac and obturator; (b) by way of the internal iliac or obturator nodes and then possibly to the superficial groin nodes.

5. The route by which malignant cells are borne to the groins has little relation to the exact location of the primary lesion if the anal canal is involved, although the inferior route appeared more frequent in this group.

6. Treatment of patients with groin metastases is not satisfactory as the three- and five-year survival rates are 16.0 and 12.5 per cent, respectively. However, it is not useless.

7. Of seventeen patients in whom groin dissections were performed, nine died of their disease in less than three years, two died after

five years, one died of other causes without evidence of disease and five are living free of disease two to six years. None of the patients having groin metastases present on admission is among those still alive.

8. The presence of metastases to the deep pelvic nodes does not always mean a fatal outcome inasmuch as four of five patients who had obturator or iliac node metastases removed by radical groin dissection are living and free of evidence of their disease two to six years.

9. If "prophylactic" groin dissections had been the practice in this series, fifty-three bilateral groin dissections would have been performed for the possible salvage of three patients who were not controlled by therapeutic groin dissection.

REFERENCES

1. Buxton, R. W. Squamous cell anal carcinoma. *Arch. Surg.*, 67: 821, 1953.
2. Cattell, R. B. and Williams, A. C. Epidermoid carcinoma of the anus and the rectum. *Arch. Surg.*, 46: 336, 1943.
3. Gabriel, W. B. Squamous cell carcinoma of the anus. *Proc. Roy. Soc. Med.*, 34: 139, 1941.
4. Grinnell, R. S. An analysis of forty-nine cases of squamous cell carcinoma of the anus. *Surg., Gynec. & Obst.*, 98: 29, 1954.
5. Keyes, E. L. Squamous cell carcinoma of the lower rectum and anus. *Ann. Surg.*, 106: 1046, 1937.
6. Pack, G. T. and Rekers, P. The management of malignant tumors in the groin. *Am. J. Surg.*, 56: 545, 1942.
7. Pack, G. T. and Baldwin, J. C. Management of tumors of the anus. *Am. J. Proct.*, 4: 297, 1953.

DISCUSSION

Garnet W. Ault (Washington, D. C.): Dr. Stearns' study is a valuable contribution to our knowledge of epidermoid carcinoma of the anal region, for it focuses our attention upon the incidence of initial and subsequent metastasis to the groin.

It seems pertinent to the entire subject to note that groin metastasis developed in twenty-nine of a total of sixty-nine patients—an incidence of 42 per cent. Sixteen of these patients had groin metastasis on admission and thirteen showed evidence of metastasis subsequent to the operative removal of the primary lesion. In eleven patients the groin metastasis became evident within two years, and in two the metastasis appeared after the two-year period.

I shall limit my initial discussion to the incidence of groin metastasis, what was done about this, and the outcome in terms of patient salvage.

Dr. Stearns has demonstrated in Table II that sixteen patients had groin metastasis upon admission. I assume that the primary lesion was uncontrollable in seven. Is this a correct assumption? Nine of these sixteen patients underwent groin dissection concurrently with excision of the primary lesion or within a few weeks. All died of epidermoid carcinoma, seven within three years and two after having reached the five-year period customarily used as the yardstick for measuring survival rates. Dr. Stearns has very wisely refrained from condemning therapeutic groin dissection for patients who have clinically recognizable groin metastasis at the time the primary lesion is recognized and treated.

What should we do for patients who have clinical evidence of groin metastasis when first seen and whose primary lesions appear resectable? I wonder if Dr. Stearns would subscribe to the following: extensive abdominoperineal resection to include aortic vena cava lymphadenectomy and bilateral obturator and iliac lymphadenectomy to the femoral canal; a wide perineal phase to include bilateral groin dissection to the femoral canal. I am raising this question, for we hope that some accord can be reached which will help us make some decision regarding our approach to the treatments of patients in this category.

Dr. Stearns has demonstrated in Table XII that groin metastasis developed in thirteen patients subsequent to admission. It appears that in two patients the primary lesion was uncontrollable; one patient had radiation therapy and two patients underwent local excision. Eight of these patients underwent therapeutic groin dissections for metastasis that appeared subsequent to resection of the primary lesion. It should be observed that the duration of freedom from clinical evidence of disease was not long in six of these eight patients. What should we do for patients whose primary lesions appear resectable and who subsequently show clinical evidence of groin metastasis? Unless I am mistaken, Dr. Stearns cannot conclusively support the thesis that we should wait and remove these unilaterally when and if groin metastasis appears.

Inasmuch as I subscribe in writing, discussion and in operative procedures to extending our surgical attack on malignancy, I should like to suggest that our main hope for improving the rather poor results existing in treating epidermoid carcinoma rests upon an extension of our operative technic. Tables VIII and IX demonstrate sufficient variability and unpredictability in the chains and nodes involved to support this attitude, for even here one-third of the patients studied had positive nodes (Table VIII), and except for failure of the perianal lesions to involve the superior hemorrhoidal nodes (Table IX) the other lesions metastasized in a relatively unpredictable fashion. Table IV indicates, without elaboration, that one should perhaps

consider altering the policy of wide local excision for perianal lesions and lesions low in the anal canal. In forty-three patients whose lesions were so located, eighteen had groin metastasis and twenty-five did not.

Dr. Stearns has very capably presented us with a report and analysis of a most important topic. Our own experience with a smaller series of epidermoid lesions is similar to his. My critical analysis and comments are a reflection of the experience of our clinical group and of our dissatisfaction with our own results. I am personally convinced that a more adequate cancer operation is badly needed for epidermoid carcinoma of the perianal region.

MAUS W. STEARNS (closing): Thank you, Dr. Ault. I was expecting a little more controversy about the question of prophylactic groin dissection because within the last year I heard two of the leaders in this field, whose only discussion concerned whether prophylactic groin dissection should be performed immediately or within two weeks after definitive surgery for the primary lesion.

As to the first question regarding policy, we agree wholeheartedly that for the locally operable lesion with groin metastases we would perform abdominoperineal resection, complete abdominopelvic node dissection, and groin dissection at the same time or within a week or two afterward.

I am not quite sure that I understood the second situation which you proposed as to the patient who did not have groin metastases on admission.

Dr. Ault: What should we do for patients whose primary lesions appear resectable and who subsequently show clinical evidence of growing metastasis? Unless I am mistaken, you cannot support the thesis that we should wait and remove these unilaterally when and if groin metastasis appears.

Dr. Stearns: I thought I did, for the simple reason that we had by far our best results in those cases in which we have done just that. Those patients in whom we were able to control the disease, and in whom groin metastasis subsequently became apparent, comprise the only group in which we have had success. We have had five completely satisfactory results of eight cases in which that was done. One patient died at thirty months free of disease, so that in six of eight patients recurrent disease did not develop. I think that was my point.

Dr. Ault: I wanted to re-emphasize it, which is the only reason I raised the question.

Use of Pedicle Skin Grafts in Anorectal Surgery

E. L. FITZSIMMONS, M.D.,* *Evansville, Indiana*

From the Department of Proctology, St. Mary's Hospital, Evansville, Indiana.

IN most anorectal operations the removal of excess skin of the perianal region and the anal canal presents no problem and at times is even necessary. Sometimes, on the contrary, it becomes desirable to restore skin to the canal. For such cases the sliding skin graft as described by Carmel[1] has added much to the improvement of results.

An occasional case remains, however, in which the sliding graft is either impractical or impossible; yet to remove all of the pathologic condition and to restore an anatomically and physiologically correct anus, it is necessary to line the anal canal with skin. For six such exceptional patients we have successfully used a pedicle type skin graft utilizing the skin of the buttocks. This paper will present the types of pathologic conditions in which the pedicle graft is desirable and will demonstrate the technic. This operation has proved very helpful in isolated patients and the complications are minor enough to justify its use.

It is not necessary at this time to discuss the desirability of restoring normal skin to the anal canal. It is true that nature will proliferate squamous epithelium over extensive areas. The product of her handiwork, however, contains only a limited elasticity and resistance to trauma. The end result too often presents a rigid tube easily damaged by the daily problem of evacuation.

INDICATIONS

There are three general indications for the use of a pedicle graft.

Extensive Disease of the Perianal Skin Involving the Anal Canal. An example of such in this series is a patient with advanced Bowen's disease. To effect a cure, the entire skin of the canal and much of that of the perianal region must be excised. The result is a completely denuded canal, with normal skin too distant to be moved by a sliding graft of Carmel. There are other types of lesions, such as an extensive leukoplakia, for which the operation should be applicable, the only limitation being the presence of malignancy.

Excessive Scar Tissue Which Will Not Permit a Sliding Graft. Often one encounters stenosis and excessive scar formation as a result of previous surgery. At times the cicatrix is so extensive that a sliding graft will not mobilize freely enough to move into the full depth of the canal; moreover, the scar itself would not be desirable as a lining for the canal.

One of the patients in this series manifested this type of lesion. The scar completely encircled the canal. Anteriorly a chronically ulcerated area was present which would not heal. The patient previously had undergone several unsuccessful operations.

This type of case represents a most useful indication for the pedicle graft because the disabling and often painful cicatrix can be entirely eliminated and replaced with normal skin.

Aid in Repairing Anal Incontinence. This technic has been used in four patients with wet perineum as a result of anal incontinence in whom it has been desirable to restore normal depth and elasticity to the anal canal.

In many patients part of the problem of anal incontinence is the shallowness of the canal combined with a fixed annular scar. The pathologic condition cannot be fully corrected without first eliminating the scar. The canal must then be covered with normal skin to prevent the recurrence of a cicatrix. This procedure also creates a normal depth to the new anal canal.

In each patient the posterior wall was restored as described by Fansler[2] to create an adequate reservoir continence. In females the anterior wall was repaired similarly if neces-

* Deceased.

sary. The external sphincters were repaired. Following this procedure a pedicle graft was laid in to cover the exposed muscle and to give flexibility to the canal.

TECHNIC

The technic of the pedicle skin graft is simple and does not differ from a similar graft elsewhere on the body. The illustrations are purely schematic and do not show the pathologic condition which was removed.

The patient is prepared adequately before surgery. Any protein or electrolyte deficiency is corrected. Antibiotics are used both pre- and postoperatively.

The size of the graft is determined at the time of operation, the base of the pedicle being left wide to aid in circulation. The arm of the pedicle extends upward away from the sitting area of the buttocks. (Fig. 1.) After it has been excised (Fig. 2), the graft is swung around into position and placed so that no tension is present. The arm of the pedicle is made a little longer than needed as it is impossible to lengthen once it has been dissected, but easy to remove the excess. The end is sutured with interrupted chromic No. 00 to the rectal mucosa (Fig. 3) at the desired level of the new anorectal line. The area from which the graft was removed (Fig. 4) is covered by suturing together the cut skin edges. A pressure dressing is applied and the patient returned to his room. In this limited series, there have been no failures.

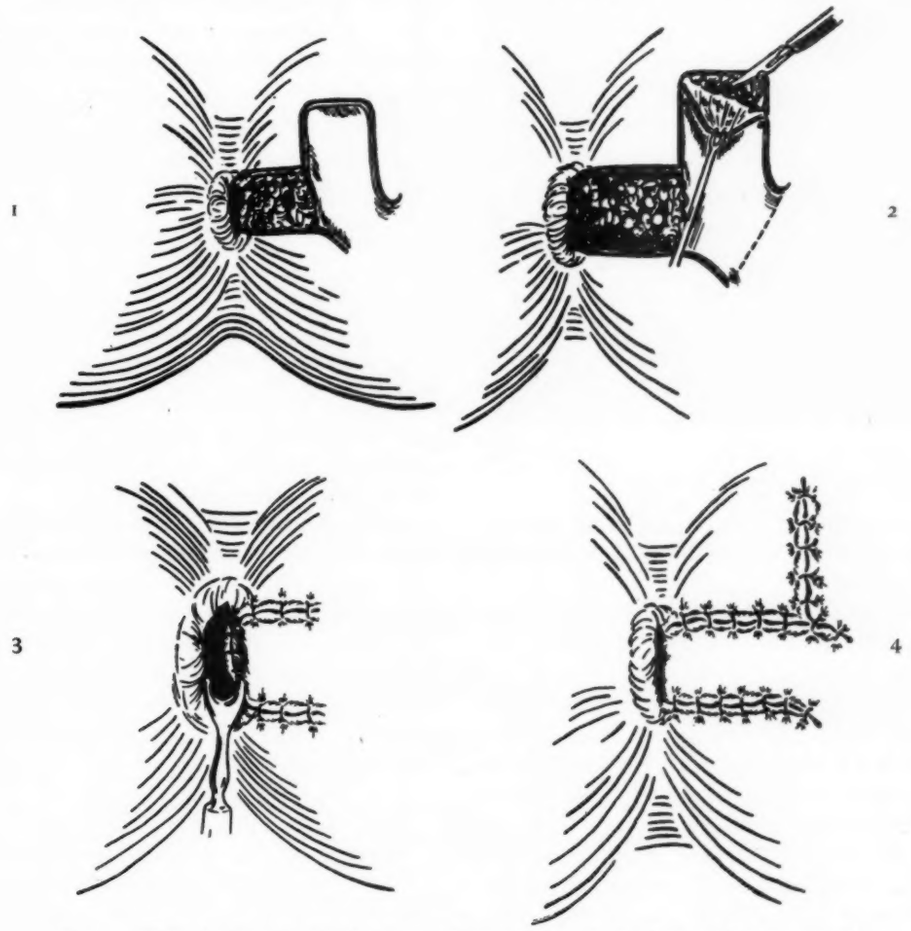


FIG. 1. This demonstrates the upward extension of the flap to be removed. FIG. 2. Demonstrates the skin flap being dissected. FIG. 3. Shows the flap sutured to form a new anorectal line. FIG. 4. Shows completion of the operation.

The operation on the patient with Bowen's disease was performed by first removing the diseased area from half the circumference of the perianal skin; and the pedicle graft, lining the canal to the anorectal line, was sutured in place.

The skin was spread and sutured laterally for

FIG. 5. Demonstrates one of the complications resulting from a separation of the skin sutures.

complete coverage. After the graft had healed, the remaining lesion was excised and the area allowed to heal by granulation.

By this method the entire pathologic condition was removed and normal elasticity restored to half of the anal canal.

The patient with the painful scar was managed similarly. The excessive scar tissue was excised in all but the posterior position. A pedicle skin graft was then placed to supply a lining for the canal, anteriorly.

Healing was uneventful and complete. The anal canal had its flexibility restored, and the patient no longer had painful ulceration.

The operation as used on the patients with anal incontinence was performed in a similar manner. All scar tissue was removed and a new canal created by restoring normal musculature. The operation was completed by a pedicle graft, either single or bilateral. The graft created a new anorectal line at an adequate depth and gave flexibility to the canal. Sometimes there is enough normal skin to permit a sliding graft on the opposite side. There is no contraindication for using bilateral pedicle grafts if necessary; and in the one patient in whom it was used, the healing was uneventful.

Figure 5 shows the end result of one operation and also one of the complications. The area of granulation is the result of a separation of the skin which had been sutured over the donor site. This granulation happened in about 50 per cent and proved more painful and required longer time for healing than did the graft itself. For this reason the flap is excised from as high on the buttock as possible to prevent the resulting scar from being on the sitting area. Regardless of the care taken to minimize scar formation of the area from which the pedicle was lifted, some localized tenderness remains for varying periods of time. The patients unanimously agree, however, that a tender scar of the buttocks is better than a painful scar of the anal canal.

SUMMARY

Occasionally the proctologist finds extensive disease which involves not only a large area of surrounding perianal skin but also the complete circumference and depth of the anal canal. In such a case it is necessary not only to remove all the pathologic condition but also to restore normal function. The creation of a pedicle graft fulfils this requirement.

This operation is not recommended as routine, nor is it suggested as a replacement for the useful but simple sliding graft of Carmel. It is suggested, however, that at times it might be useful to an operating surgeon who finds himself with too little too late. It is recommended, therefore, that this surgical procedure be added to the armamentarium of the proctologist.

REFERENCES

1. CARMEL, A. G. Modern surgery; treatment of hemorrhoids and a new rectoplasty. *Am. J. Surg.*, 75: 320, 1948.
2. FANSLER, W. H. The repair of ano rectal incontinence following operation for fistula. *Southb. M. J.*, 45: 229, 1952.

DISCUSSION

A. GERSON CARMEL (Cincinnati, Ohio): Numerous terms have been employed in plastic surgery, some synonymously and some with variable connotations so that confusion may result. Therefore, it may be in order to begin this discussion by recalling a few definitions.

A tissue graft is a portion of tissue that is deliberately detached, partially or completely from its native site, moved to another area, and held in place there until it grows to the new site and remains permanently. A pedicle graft is one that is not completely severed from all its original attach-

ments. It has also been called a flap graft. The pedicle is that portion which is not cut from its native connections, and it carries the blood supply of the flap of tissue which is to be moved. Included in pedicle grafts is the sliding pedicle graft, or for brevity merely called sliding graft, so named because the mobilization is performed so that the freed tissue may be simply advanced or slid to a new site; then there is the rotation pedicle graft, sometimes spoken of merely as a rotation graft, thus called because the donor flap is brought to the recipient area by rotating it into the desired location.

Dr. Fitzsimmons has advantageously applied rotation pedicle grafts in surgery of the anal canal.

The handling of scar tissue in this area may tax one's judgment. Extensive excision is rarely necessary and indeed may be followed by formation of new scarring. I have had satisfactory results from radial incision into a scarred anal ring, combined with sliding a flap into the space formed by separation of the wound edges after incision.

It is striking how much elasticity is restored after the procedure of sliding a pedicle graft into the anal ring, without excision of tissue. A possible explanation is that the formation of living scar tissue may be a reversible process in this area, and that once the abnormal tension is released and tissue of normal elastic properties supplied by a flap graft, increased tension does not recur and the scar tissue becomes less and less evident.

I have been frequently asked about the hair on the perianal skin that is brought up to line the anal canal. In some instances hair is seen to persist. However, symptoms are not produced and patients do not complain.

I am delighted that Dr. Fitzsimmons has contrived an adaptation that will enhance our ability to restore normalcy to an impaired anal canal. I was disappointed that in 50 per cent of his cases suturing of the edges of the donor wound proved unsuccessful; I had hoped that this disadvantage had been overcome. However, it is not a serious objection. Recently a preparation called aeroplastin has been employed as a covering for the donor site in other parts of the body and it may serve the purpose here.

The problems of dead space and blood supply are to be considered in any pedicle graft whether it be of sliding or rotation type, although they are less with the former. These problems can be satisfactorily met if the procedure is properly executed, and such factors avoided as infection, active bleeding and tension on wound edges, and if careful suturing is done where necessary and adequate blood supply in the pedicle is maintained.

Although the series reported comprises but six cases, the rotation pedicle graft which has been described appears to be a useful addition to the technics available in attempting to restore the perianal region and the anorectal tube to normalcy, and I believe the method merits a trial when the situation is presented that suggests its usefulness.

E. L. Fitzsimmons (closing): I would like to point out again that the indications for the two operations are different. We use the Carmel procedure whenever possible. The pedicle graft is only for extensive disease or if there is a large denuded area and the skin too distant to slide into the canal.

Dr. Carmel is right about the blood supply. However, we find that if pressure dressings are applied for forty-eight hours, there is no difficulty.

Anorectal Complications in Leukemia

W. A. Blank, M.D., *Toledo, Ohio*

Pathologic changes in the oral cavity[5–7] and other areas of the gastrointestinal tract[2,8,9] have frequently been described as complications in patients with leukemia. The anorectal area, on the other hand, has only rarely been recorded as becoming involved. Marks[5] reported a case of monocytic leukemia in which necrosis occurred in the anal canal. An instance is cited by Walsh and Stickley[11] in which the diagnosis of leukemia was not made until after the appearance of an anorectal lesion.

In a detailed study of 123 consecutive cases of leukemia which came to autopsy, Kirshbaum and Preuss[4] described no instance of abnormality in the anorectal area. This would strongly suggest that anorectal lesions are rare in the terminal phase of the leukemic patient. A review of the University of California Hospital records by Birnbaum and Ahlquist[1] shows that of 409 patients with blood dyscrasias, anorectal complications developed in fourteen. Yeomans,[12] Silvers[10] and Carmel[3] have reported instances of anorectal involvement in individuals with agranulocytosis, a disease manifesting similarities to aleukemic leukemia.

It is not within the scope of this paper to deal with many of the factors involved in the disease process of leukemia. Five cases will be presented in which significant anorectal lesions developed in patients with leukemia. For the sake of brevity, data such as blood counts, bone marrow studies and other laboratory procedures pertinent to the diagnosis of leukemia have for the most part been omitted. The diagnosis of leukemia was made by qualified hematologists and pathologists, and each case is well documented. Two of the cases in this study were not under my personal observation but have been taken from records by permission of Doctors Wendell Green and Foster Meyers, Toledo, Ohio.

CASE REPORTS

Case I. N. S., a three and a half year old white male child, had been under treatment at The Toledo Hospital for acute lymphatic aleukemic leukemia for eighteen days when anorectal symptoms developed. The initial change noted was acute thrombosis with associated inflammation and edema of the posterior one-third of the anal margin. The color of the involved area became progressively darker and within twenty-four hours there were superficial areas of ulceration. This was promptly followed by necrosis and slough which extended into the lower rectal ampulla. About one-half of the posterior anal margin, anal canal and lower rectum was denuded by the sloughing process. This left irregular, edematous edges, between which the anal musculature was exposed. Treatment in this area consisted of warm, moist compresses, frequent cleansing and anesthetic ointments. Broad spectrum antibiotics were being used when the anorectal lesions developed and were continued until the child died, which was four days after onset of the anal condition. The pain caused by this process was difficult to control and was further aggravated by diarrhea which had developed. Autopsy findings confirmed the diagnosis of acute lymphatic aleukemic leukemia with the bone marrow showing almost complete suppression of activity. Microscopic examination of the anorectal area showed necrosis of tissue involving the mucosa of the lower rectum and anus with a large number of bacteria present.

Case II. D. H., a two year old white female child, had been under treatment at Riverside Hospital for acute lymphatic aleukemic leukemia for twelve days when extensive thrombosis developed at the anal margin. During the next two days the entire left anal margin became a very dark blue color. Ulceration and slough promptly followed and the necrotic process extended into the lower rectal ampulla. The tissue destruction continued into the anal sphincter, giving rise to incontinence. The wound assumed a dusky, dirty appearance with edematous, elevated edges from which there was considerable oozing of blood. Treatment consisted of warm, moist applications, frequent

changes of dressings and anesthetic ointments. Broad spectrum antibiotics were used continuously. The associated pain caused severe distress to a child who was critically ill. There was very little evidence of healing in the anorectal wound until about thirteen days after its onset. At this time there was notable improvement in the child's general condition and within the next twelve days she had improved sufficiently to warrant discharge from the hospital. In the following two and a half months the entire anorectal wound epithelized. She remained incontinent, however, and there was protrusion of redundant rectal mucosa through the defect caused by the destruction of sphincter muscle. Frequent involuntary bowel movements were temporarily controlled by means of periodic irrigations. Approximately two months later the child died. No autopsy was permitted.

Case III. G. F., a seventy-nine year old white man had been under observation and treatment for chronic lymphatic leukemia for about two years before anorectal pain developed. When first examined a large anal ulcer with a dirty, necrotic base was present. Its edges were elevated, firm and inelastic, and there was a fibrous polyp at its upper pole. The pain was partially controlled by means of sitz baths. About eighteen months later he was admitted to The Toledo Hospital with a perianal abscess which was treated by incision and drainage. Only a few drops of purulent discharge were obtained. The abscess area consisted largely of spongy, gray necrotic tissue. The pyogenic membrane usually seen at the periphery of an abscess cavity was absent and the infection extended into the adjacent tissue without definite limits. During the following four days his fever subsided and he was relatively free from pain. At this point, however, a definite change took place; his temperature started to rise and there was extension of the infection beyond the original area. He had been receiving antibiotics since his admission to the hospital. Nonetheless, the entire right buttock became indurated and a bluish discoloration appeared. Treatment consisted of blood transfusions, antibiotics and maintenance of body fluids and electrolytes. The patient's temperature rose to a high of 105.8°F. and he died on the eleventh postoperative day. At autopsy the diagnosis of lymphatic leukemia was confirmed. Unfortunately no description, either gross or microscopic, was made of the anorectal or gluteal area.

Case IV. S. W., a thirty-eight year old white man, was under treatment for myelogenous leukemia when anorectal pain developed following a barium enema x-ray examination. When examined one month later an area of ulceration occupying the posterior anal canal had developed. The base of the ulcer was gray and necrotic, and its elevated edges were firm and thickened. The skin at the margin of the ulcer was edematous and extremely tender. Symptomatic treatment consisting of an anesthetic ointment and warm, moist compresses proved inadequate and a narcotic was necessary to control the anorectal pain. Five days later the patient entered Mercy Hospital where he died a few hours after admission. An autopsy was performed with confirmation of the diagnosis of myelogenous leukemia although the immediate cause of death was listed as bronchopneumonia. No examination was made of the anorectal area.

Case V. E. M., a sixty-two year old white woman, was admitted to The Toledo Hospital on May 17, 1935, with the complaint of rectal pain of ten days' duration. The blood count on admission showed 39,000 white cells, 73 per cent of which were lymphoblasts; she also had severe anemia with a hemoglobin of 55 per cent. A diagnosis of lymphatic leukemia was made. She had had no symptoms or treatment referable to this disease prior to the present admission.

There were areas of sloughing at the anal margin anteriorly, posteriorly and in the left lateral area. The largest area was on the left where it extended about 5 cm. beyond the anal margin. There was palpable induration extending into the left posterior anal canal. The day after admission the margins of the areas of slough were excised in order to provide better drainage. The induration in the left posterior canal was not removed. Following this procedure the patient's condition deteriorated rapidly. The white cell count rose to 98,000 on the second postoperative day. She became increasingly more febrile, reaching a high of 105.4°F., and died on the third postoperative day. No autopsy was performed although microscopic examination of the tissue removed at operation was described as showing hemorrhoids, moderate subacute inflammation and leukemic infiltration.

Blank

COMMENTS

The anorectal lesions observed in this study consisted of thrombosis, ulceration and abscess formation. While such types of lesions are commonplace, their behavior and severity in these patients with leukemia were far from usual. In Cases I and II, in which marginal anal thrombosis appeared as the initial pathologic change, the thrombotic process did not remain confined to the superficial veins of the external hemorrhoidal plexus. Instead, there was extension into the anal canal and lower rectum resulting in necrosis and slough, not only of the epithelial component but also of the underlying muscularis. The sequence of events seen in these cases followed similar patterns and in each instance appeared when the patient was critically ill. The appearance of the anorectal lesions at that time produced great discomfort and no doubt contributed to the death of one of the patients.

In none of these cases did the patients demonstrate wound-healing ability to more than a minor degree. Case IV exemplifies this fact in that the patient was unable to heal the trauma incurred during administration of a barium enema for x-ray examination of the colon. This would suggest the necessity for utmost care when patients with leukemia are subjected to instrumentation.

Surgical treatment of anorectal lesions in two of these cases resulted in the death of each one. This does not imply that the deaths were directly due to the operative procedures, for in two other instances the patients also died a short time after the anorectal lesions developed even though no surgery had been performed. It does, however, point out the well known fact that leukemia is a fatal disease; for this reason, then, it would seem prudent to treat the anorectal lesions symptomatically and avoid surgical measures when possible.

It is generally known that individuals with leukemia are susceptible to various types of infections. In these cases antibiotics appeared relatively ineffective in controlling the infections in the anorectal lesions. The nature of the abscess in Case III demonstrates that in the absence of normal-functioning myeloid elements the usual formation of pus and pyogenic membranes which serve to delineate the extension of the infection does not occur.

Case V is another instance where the initial symptom which led to the diagnosis of leukemia appeared in the anorectal area. This serves to emphasize the necessity for careful observation of blood examinations prior to any surgical procedure. It is also a reminder that the specialist, too, must be on the alert for the manifestations of systemic diseases in his particular realm of interest.

It would appear logical to assume that anorectal lesions have been present in a far greater number of individuals with leukemia than is indicated in the literature. The fact that more instances have not been recorded may in part be attributed to the fact that the routine postmortem examination either is inadequate or completely ignores the anal area. The latter was the situation in two of the cases presented herein.

SUMMARY

1. Five cases have been presented in which anorectal complications developed in patients with leukemia.

2. Anal ulcers, abscesses, necrosis and slough were the lesions encountered. These were painful and disabling, and presented a special problem in the management of the leukemic patient.

3. A case is presented in which the diagnosis of leukemia was made only after onset of an anorectal lesion. This exemplifies the need for careful evaluation and blood studies before surgery is attempted on any anorectal lesion.

4. From the experience gained in these few cases in which anorectal lesions developed in patients with leukemia it would appear advisable to treat these lesions symptomatically and with conservatism, thus avoiding surgical measures whenever possible.

REFERENCES

1. Birnbaum, W. and Ahlquist, R. Rectal infections and ulcerations associated with blood dyscrasias. (Personal communication.)
2. Boiken, W. S. Leukemic changes of the gastrointestinal tract. *Arch. Int. Med.*, 47: 42–57, 1931.
3. Carmel, A. G. Agranulocytic angina. *Tr. Am. Proct. Soc.*, pp. 276–284, 1944.
4. Kirshbaum, J. D. and Preuss, F. S. Leukemia. *Arch. Int. Med.*, 71: 777–792, 1943.
5. Marks, M. M. Monocytic leukemia: oral and anorectal involvement. *J. Internat. Coll. Surgeons*, 22: 750–752, 1953.
6. McCarthy, F. P. The oral lesions of monocytic leukemia. *New England J. Med.*, 234: 787–790, 1946.
7. Moloney, W. C. Clinical significance of oral lesions in acute leukemia. *New England J. Med.*, 222: 577–579, 1940.

8. Pearson, B., Stasney, J. and Piszolato, P. Gastrointestinal involvement in lymphatic leukemia. *Arch. Path.*, 35: 21–28, 1943.
9. Schottenfeld, L. E. and Diamond, D. Unrecognized leukemia simulating apparent surgical conditions. *Am. J. Surg.*, 85: 669–672, 1953.
10. Silvers, H. I. Agranulocytosis with rectal necrosis. *Tr. Am. Proct. Soc.*, pp. 76–79, 1933.
11. Walsh, G. and Stickley, C. S. Acute leukemia with primary symptoms in the rectum; a rapid increase in the white cells and fatal outcome. *South. Med. & Surg.*, 96: 684–689, 1934.
12. Yeomans, F. Agranulocytosis with anal involvement. *Tr. Am. Proct. Soc.*, pp. 24–34, 1930.

DISCUSSION

Raymond J. Jackman (Rochester, Minn.): I am pleased to have this opportunity to discuss Dr. Blank's paper and I wish to congratulate him on calling this complication to our attention.

It is a well known and established fact that the presenting complaint of many patients having acute leukemia will be either an oral or rectal lesion. Just as the leukemic patient whose main complaint is a sore mouth with bleeding and ulcerating gums will have his teeth extracted by the unwary dentist, so will the leukemic patient whose initial symptoms are predominantly rectal have some type of rectal operation performed by the unwary physician. Any such procedure obviously will only make the patient more miserable, will frequently result in a wound that fails to heal and will probably hasten the death of the patient.

Another point that Dr. Blank did not mention in his discussion is that among a number of patients having acute leukemia and being treated with antifolic substances (such as aminopterin and amethopterin) rather severe diarrhea with ulceration and bleeding of the rectum will develop. This process is usually reversible if administration of the antifolic substance is stopped and a folinic or citrovorum factor given.

As Dr. Blank has indicated, formation of perianal abscesses, anal and rectal ulcerations, and thrombosed necrotic hemorrhoids are not uncommon among patients having leukemia. In general, for those complications it is best to carry out only emergency surgical measures such as incision and drainage of abscesses. Usually any other local treatment is palliative in nature, such as warm cleansing tapwater enemas, hot witch hazel compresses and topical preparations to relieve pain.

The other point that I would like to reiterate is that any surgeon performing rectal operations should be alert to the fact that early symptoms of the leukemic patient may be predominantly rectal.

Kenneth E. Smiley (Los Angeles, Calif.): Most of us learn best the hard way, and I must say that I have learned the hard way in dealing with this particular difficulty.

The appearance of the ulceration as described by Dr. Blank should make us suspicious of the correct diagnosis. However, many times the lesion is so painful that it is almost impossible to examine the patient without anesthesia. One should rarely, if ever, get into any diagnostic difficulties with the hospital cases because there the blood count is done routinely and the diagnosis of the general disease is made. It is when the patient is examined either in the office or in the home that the diagnosis can be easily missed unless one is particularly alert and keeps the anorectal complications of leukemia in mind.

This is certainly a very valuable contribution and we should be grateful to Dr. Blank for bringing it to our attention.

Emil Granet (New York, N. Y.): Dr. Blank, did you find associated acute adenopathy of the inguinal glands in your cases? I also would like to know if any inordinate bleeding was associated with surgery.

William A. Blank (closing): In answer to the question concerning adenopathy, I recall one instance in which there was definite enlargement of the inguinal lymph glands after the anorectal lesions developed. This occurred in the case in which there was extensive slough.

Excessive bleeding was encountered during surgery but in each instance it was successfully controlled by the application of external pressure. While this point was not emphasized, I think it is generally accepted that patients with leukemia are very prone to bleeding. On that basis simple internal hemorrhoids would be expected to bleed more freely in patients with leukemia.

Construction of Pouch Using "Pantaloon" Technic for Pull-through of Ileum Following Total Colectomy

REPORT OF EXPERIMENTAL WORK AND RESULTS

MIGUEL A. VALIENTE, M.D. (*By Invitation*), *Hato Rey, Puerto Rico,* AND HARRY E. BACON, M.D., *Philadelphia, Pennsylvania*

FOR years the establishment of an ileostomy has been the major objection to operations associated with total colectomy and proctectomy. At present the technic as to management of the ileostomy and its stoma has progressed to a point where it no longer constitutes a major problem for either the patient or the surgeon. The advent of the different ileostomy appliances and the improvement in surgical technics in the construction of the ileostomy stoma have almost completely eliminated the problem. However, one obstacle still remains, which is the hesitancy on the part of the patient to adjust himself to a permanent ileostomy and its care. Almost universally, these patients are happy and completely satisfied once this mental adjustment has taken place because of the improvement in general physical condition and the elimination of the fear of the disease which requires this type of surgery. In spite of the truthfulness of the aforementioned facts, we are certain that these patients would welcome a procedure by which the anus with its sphincter mechanism is preserved.

Various operations have been undertaken, but thus far they have proved unsatisfactory in a large percentage of cases. To enumerate a few, one can mention temporary ileostomy with later re-establishment of bowel continuity, partial resection of the bowel and "pull-through" of ileum with anastomosis of ileum to anus.

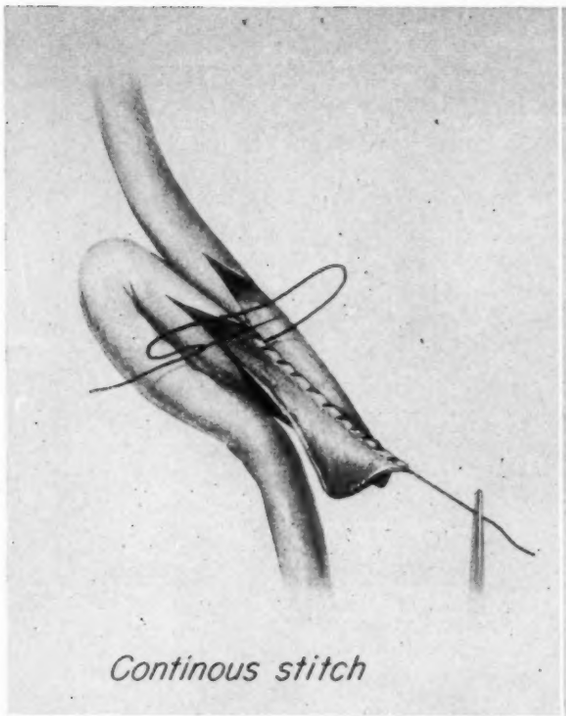
The first reported case of anastomosis of ileum to anus was presented by Nissen in 1933.[1] This case had a double-barrel loop of ileum anastomosed to the anus through a sacral approach. Ravitch,[2] Wangensteen and Toon,[3] Best,[4] Devine and Webb[5] and Casanova-Diaz,[6,7] in reporting their experiences, cite a total of thirty-four cases in which they claim satisfactory results in twenty instances and unsatisfactory results in the other fourteen. From their experiences it seems that those patients who have fared best are those with an ileostomy or ileosigmoidostomy which has been established for some length of time prior to anastomosis of the ileum to the anus. The number of bowel movements and the irritation to the anal and perianal regions by the ileal contents were minimal. This, of course, is understandable since the ileum has been conditioned to take over the water-absorbing action of the proximal colon. Babcock[8] performed the operation in three cases, two of which had to be changed to an abdominal ileostomy; the other patient died. Payne[9] and Hay[10] both reported one case in which replacement to the abdomen was necessary. Casanova-Diaz,[6] in one of his cases, utilized a longitudinal incision in the antimesenteric border and several circular incisions in the distal portion of the ileum in such a fashion as to transect the muscle fibers. This was done in an attempt to slow down the motility of the bowel. He obtained gratifying results, but unfortunately an abscess developed between the ileum and rectal stump.

A list of the main problems associated with this type of procedure includes: frequency of bowel movements, excoriation of anal and perianal skin, anal fistulas and abscesses, electrolyte and fluid imbalance, abdominal pain and cramps. It seems logical to assume that if the rate of bowel movements are diminished to a reasonable minimum, the bulk of these problems will be solved.

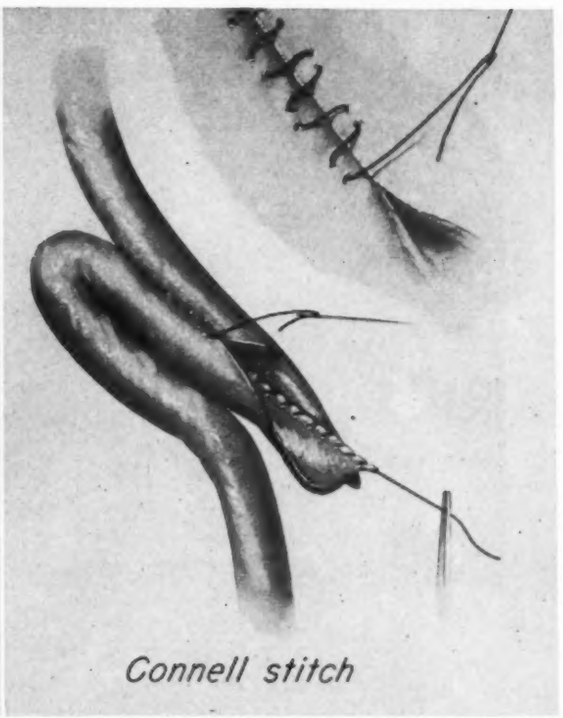
This work deals with a proposed pull-through of the ileum through the anus with

Construction of Pouch Following Total Colectomy

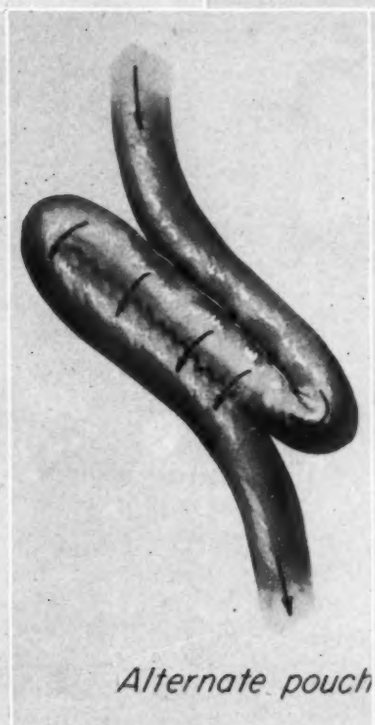
1



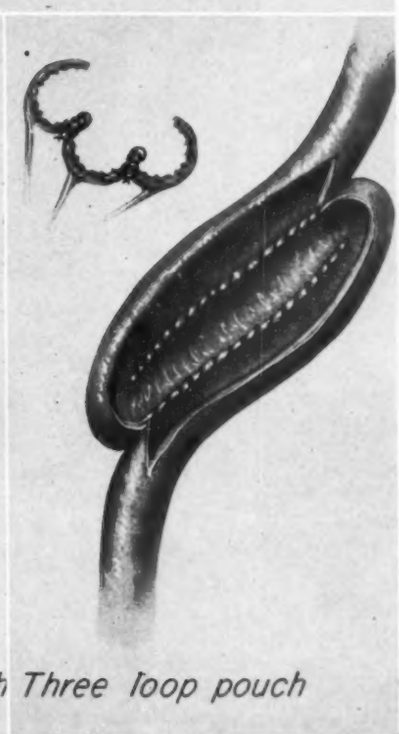
2



3



4



5

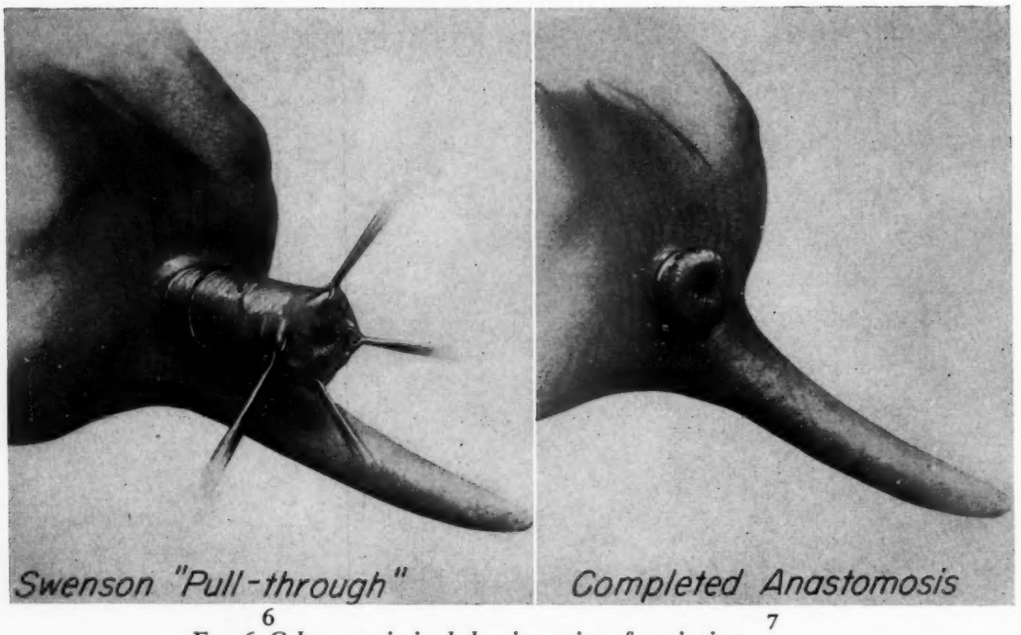
FIG. 1. Posterior wall, over and over sutures.

FIG. 2. Anterior wall, continuous Connell stitches.

FIG. 3. Pouch oriented caudad.

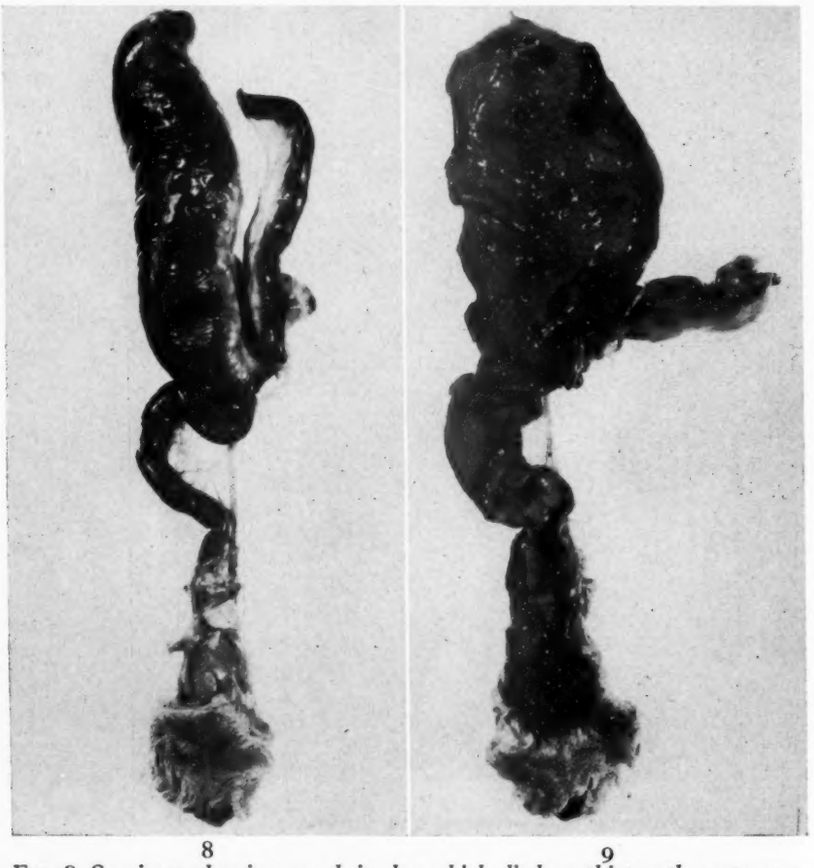
FIG. 4. Same type of two-loop pouch with bottom oriented cephalad.

FIG. 5. Additional type of pouch made from three loops of bowel.



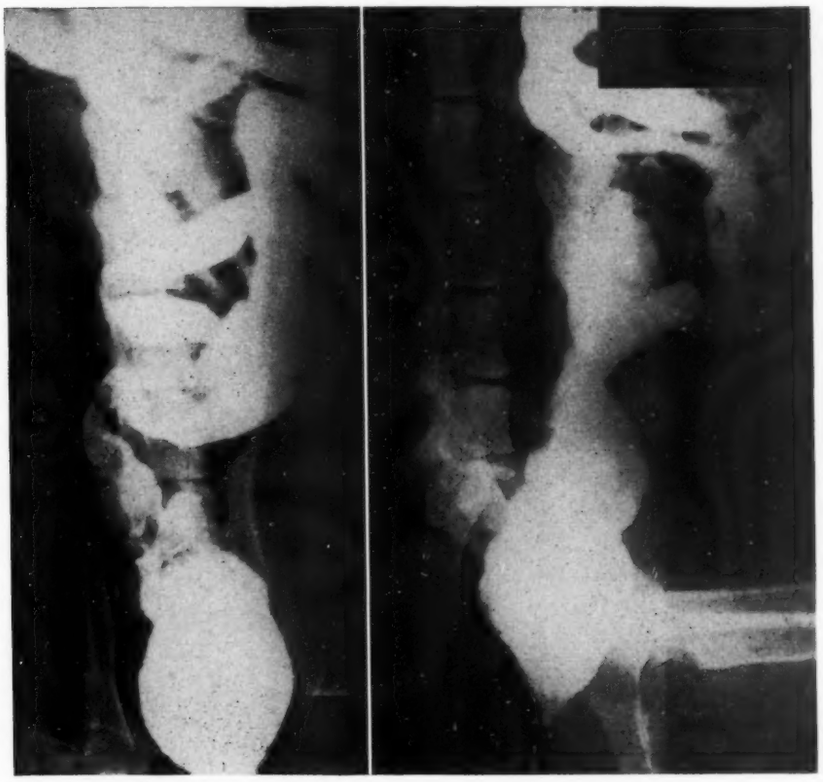
6 7

FIG. 6. Colon exteriorized showing point of sectioning.
FIG. 7. Completed anastomosis between ileum and anal stump.



8 9

FIG. 8. Specimen showing pouch in dog which died on thirteenth postoperative day. Two-loop pouch.
FIG. 9. Same specimen as Figure 8 after opening, showing size of pouch as compared to lumen of bowel.



10 11

FIG. 10. Anteroposterior view of dog on twenty-first postoperative day showing pouch.

FIG. 11. Lateral view of same dog as Figure 10.

preservation of an intact sphincter mechanism, and a side-to-side ileoileostomy, the purpose of which is to establish a pouch which would serve as a reservoir for ileal contents. This pouch would obviate the almost constant need to evacuate the bowel content. The pouch is constructed in a similar manner as the technic used in the so-called "pantaloon" operation for cases of total gastrectomy. It is our belief that if an adequate pouch can be obtained and the sphincter mechanism can be preserved intact, it would be possible for these patients to retain the ileal contents enough so that only three or four bowel movements take place every day.

TECHNICS APPLIED IN EXPERIMENTAL ANIMALS (DOGS)

The colon and ileum are mobilized to the fullest possible extent both proximally and distally. A side-to-side ileoileostomy is performed for a total length of approximately 12 inches of the distal ileum, forming a pouch 6 inches in length after allowance for a loop long enough to reach the anus. This pouch has been constructed in three different ways; one in such a fashion that the bottom of the pouch points cephalad (Fig. 4), another in which the bottom of the pouch points caudad (Fig. 3) and the other in which a three-loop pouch is established. (Fig. 5.)

In the dog where the normal position of the animal is horizontal, orientation of the pouch makes little difference; in man, however, the pouch pointing caudad should rationally be more effective, being placed in a dependent position. In constructing these pouches, a continuous over and over suture of linen has been used for the inner row. (Fig. 1.) For the outer row, a continuous Connell suture has been employed. (Fig. 2.)

After the pouch has been constructed, the loop distal to the pouch is tacked to the pouch for stability using two or three interrupted sutures from mesentery to mesentery of both loops close to the bowel wall. In the three-loop pouch this step is naturally not performed.

The abdomen is then closed using No. 32 steel alloy wire sutures (continuous) for the

12 13

FIG. 12. Anteroposterior view of same dog as Figures 10 and 11 twenty-four hours after barium enema.

FIG. 13. Lateral view of same dog twenty-four hours after barium enema.

peritoneum and fascial layers, and another row of No. 32 steel alloy wire sutures (continuous) for the skin. The liberated colon is then everted through the anus by applying traction on the mucosa with Babcock's visceral forceps, thus creating procidentia of the colon. (Fig. 6.) When this is accomplished, the bowel close to the anus is cut across circumferentially and the mobilized colon and distal ileum are delivered. The ileum is then sutured to the anal stump using an interrupted sero-serosal row of sutures and a continuous row of sutures through all layers. (Fig. 7.) The anastomosed bowel is then replaced into the abdominal cavity.

In performing these operations our greatest difficulty has been the mobilization of the ileum which, in some instances, has been of insufficient length to establish an anastomosis free of tension with concomitant leakage at this point. The conformation of the vascular arcades limits the extent to which the ileum can be mobilized. Other proposed technics include a "pull-through" with elimination of all the rectal mucosa and suturing the mucosa of the ileum to the anorectal line; "pull-through" of the ileum with elimination of the rectal mucosa but leaving a short stump of ileum protruding from the anus. This latest technic would be an attempt to protect the anal and perianal skin from the irritating effects of the ileal contents. This stump could be excised at a second stage after sufficient recovery from operation warrants it. In the dog, with the almost continuous horizontal position of the belly, orientation of the pouch has very little significance; in the human, however, it may prove of value. Another step which might help would be the anchoring of the pouch to the posterior abdominal wall by several sutures from mesentery to wall.

RESULTS (TABLE 1)

Dog 1. The animal died on the fourteenth postoperative day because of leakage at both lines of suture, ileoileostomy and ileo-anal. There was a considerable amount of bleeding at the time of operation. The post-operative course was stormy. The dog did not show any inclination to eat by its own volition,

and when tube fed it vomited most of the time. It was able to retain only those fluids which it drank spontaneously.

At autopsy profound pallor of all tissues was found, consequent to anemia. None of the wounds showed any signs of healing. The pouch was of the same size as when it had been constructed.

TABLE 1

No. of Dog	Date	Results
1	1/8/55	There was too much bleeding at time of operation; death was on 14th postoperative day; postmortem examination revealed complete absence of healing
2	1/17/55	Died on 13th postoperative day from hypopotassemia; stools turned from liquid to mushy by 5th day; swelling of scrotum totally subsided by time of death; postmortem examination revealed complete healing, good-sized pouch
3	2/7/55	Died from peritonitis from leakage at ileo-anal anastomosis on 3rd postoperative day
4	3/8/55	Same as dog 3
5	3/28/55	Weight: preoperatively 30 lb., 1½ wk. postoperatively 28 lb., April 27th 30 lb., May 11th 31 lb.; edema of perineal region subsided by 13th day; stools liquid to mushy in 5 days; at present 3–4 stools daily of mushy consistency; x-rays April 18th showed good-sized pouch and x-rays April 19th showed barium totally expelled; regular diet since 1st postoperative day
6	4/12/55	Weight: preoperatively 29 lb., 1½ wk. postoperatively 27½ lb., May 11th 29 lb.; edema of perianal region with complete recovery by 12th day; stools liquid to mushy in 5 days; at present 4–5 stools daily, mushy
7	5/9/55	Died of peritonitis on May 12th; leakage at ileo-anal anastomosis; pouch good size (triple lumen)

Dog 2. This animal died on the thirteenth postoperative day from chemical imbalance, namely, hypopotassemia. It started to eat spontaneously on the first postoperative day, stools started to turn mushy on the fifth postoperative day and there were frequent stools. Irritation of the perianal region was minimal, the only visible sign being edema of the scrotum which subsided by the tenth postoperative day.

On postmortem examination all tissues and anastomoses were found to be well healed. There was a large pouch (Figs. 8 and 9), much larger than that resulting from the anastomosis at time of operation.

Dogs 3 *and* 4. These animals died on the third postoperative day of peritonitis from leakage at the ileo-anal anastomosis. Both these dogs started to eat on the first postoperative day. The ileo-ileal anastomosis looked good in both cases and both showed a pouch larger than that resulting from surgery. There was difficulty in the mobilization of the ileum and the resulting ano-ileal anastomosis was under tension.

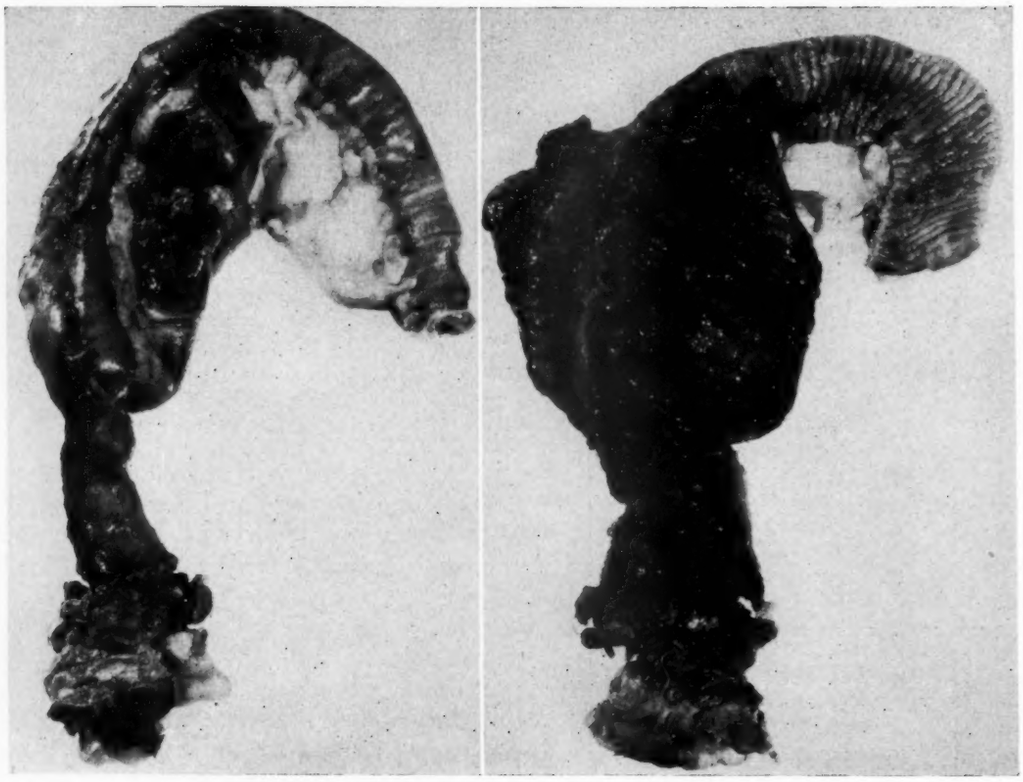
Dog 5. This dog was operated upon in the same fashion as the others except that the anastomosis was performed by the abdominal route in order to prevent an anastomosis under tension. The dog started eating on the first postoperative day. The electrolyte balance was maintained by intravenous fluids the first three postoperative days besides the usual salt and potassium citrate which was given to dogs 2, 3 and 4 by the oral route. Stools were loose and of a dark, greenish brown color for the first five days, after which the stools started to become less liquid. The dog strained at frequent intervals the first few days but by the tenth day it was having an average of four stools a day. The stools were of a mushy consistency, normal in color and fairly large each time.

Edema of the perianal region developed which had totally subsided by the twelfth postoperative day. This dog weighed 30 pounds at the time of surgery; eleven days later it weighed 28½ pounds, and on the twenty-first day it weighed 29 pounds. On the twenty-eighth postoperative day it had regained all of the weight loss and on the forty-second postoperative day weighed 31 pounds.

Barium enema was given on the twenty-first day (Figs. 10 and 11) and x-rays revealed a large pouch in the distal ileum. The remainder of the ileum looked normal. X-rays on the twenty-second day (Figs. 12 and 13) failed to reveal any residual barium in the bowel.

Dog 6. Operation was performed on April 12, 1955. Preoperatively the dog weighed 29 pounds. One and a half weeks postoperatively it weighed 27½ pounds. On May 11th it had regained its preoperative weight.

Edema of the perianal region developed,



14 15

FIG. 14. Specimen of three-loop pouch on dog which died three days postoperatively.

FIG. 15. Specimen showing size of opened pouch.

with complete recovery by the twelfth day. Stools changed from liquid to mushy in five days. At present this dog is having from four to five stools a day.

Dog 7. This animal died of peritonitis on the third postoperative day. In this case the three-loop pouch (Fig. 5) was constructed.

Autopsy revealed leakage at the ileo-anal anastomosis. The resulting pouch was very good and had been holding well. (Figs. 14 and 15.) We consider that this technic offers very good possibilities. Hays[11] reported two cases in which a three-loop pouch of jejunum was constructed as a substitute stomach with very satisfactory results.

All experimental dogs have been fed the usual diet of milk and meat which is used for all of the other dogs in the animal room.

CONCLUSIONS

The construction of a pouch utilizing the distal ileum has been employed experimentally in a series of seven dogs. Although five died, the results in two have been gratifying in that a satisfactory and adequate pouch was established, the sphincter control was preserved in its entirety, the number of stools decreased and their consistency became mushy to formed, while the perineal irritation was minimal. The capacity of this pouch to empty has been demonstrated by x-ray studies.

REFERENCES

1. NISSEN, R. Berlin Chirurgical Society. *Chirurg.*, 15: 888, 1933.
2. RAVITCH, M. M. Anal ileostomy with sphincter preservation in patients requiring total colectomy for benign lesions. *Surgery*, 24: 170, 1948.
3. WANGENSTEEN, O. H. and TOON, R. W. Primary resection of colon and rectum with particular referral to cancer and ulcerative colitis. *Am. J. Surg.*, 75: 384–404, 1948.
4. BEST, R. R. Evaluation of ileoproctostomy to avoid ileostomy in various colon lesions. *J. A. M. A.*, 150: 637–642, 1952.
5. DEVINE, J. and WEBB, R. Resection of rectal mucosa, colectomy and anal ileostomy with normal continence. *Surg., Gynec. & Obst.*, 92: 437–442, 1951.
6. CASANOVA-DIAZ, A. S. Diffuse familial polyposis. *Bol. d. Asoc. méd. de Puerto Rico.*, 46: 307–315, 1954.

7. Casanova-Diaz, A. S. Personal communication.
8. Babcock, W. W. Cited by Bacon, H. E. Anus, Rectum, and Sigmoid Colon, vol. 1, 3rd ed., p. 301. Philadelphia, 1949. J. B. Lippincott Co.
9. Payne. Cited by Bacon, H. E. Anus, Rectum, and Sigmoid Colon, vol. 1, 3rd ed., p. 301. Philadelphia, 1949. J. B. Lippincott Co.
10. Hay. Cited by Bacon, H. E. Anus, Rectum, and Sigmoid Colon, vol. 1, 3rd ed., p. 301. Philadelphia, 1949. J. B. Lippincott Co.
11. Hays, R. P. Anatomic and physiologic reconstruction following total gastrectomy by the use of a jejunal food pouch. *S. Forum*, 4: 291–295, 1953.

DISCUSSION

Rupert B. Turnbull (Cleveland, Ohio): I would like to commend the authors for trying to keep this dream of ileorectal anastomosis alive because I believe that somewhere in the future someone may perhaps solve this problem; and as the authors have stated in their work, it would be desirable to be able to remove the rectum and have intestinal continuity rather than a stoma on the abdomen. I think this is in the dream stage, however, at the present time.

The authors have called attention to the fact that in a review of human patients treated to date in this country, 41 per cent had failure with the surgical procedure. I would also like to call attention to what this operation is, namely, ileorectostomy and not ileo-anal anastomosis. In other words, some of the rectum above the dentate line is left intact in this operation.

Dr. John Snyder of St. Louis recently reported ileoanal anastomosis in humans at the Central Surgical Association meeting. He was much encouraged because one or two of the patients got by and made an adjustment; however, the majority of the patients had surgical tragedies. We therefore are not yet ready to accept this sort of procedure in humans.

In pull-through operations, if the rectal mucosa or the rectum is removed down to the dentate line, we do not get what we consider to be rectal continence. It is a makeshift rectum at best, whether it be colon that is brought down or ileum, and it is worse with ileum.

When the colon is brought down to the anus, there is a chance of developing so-called colon or reservoir continence by habit, habitual bowel movements at certain times during the day, or by emptying the colon with cleansing enemas and waiting for it to fill up within forty-eight hours.

When the small intestine is brought down to the anus, (the anal mucosa down to the dentate line or some point distal to that), there is a more serious problem because reservoir continence is impossible with the small intestine. The contents are constantly being propelled; and when you remove rectal mucosa, you have moved the warning receptors from inside to outside. (When they are outside, it is too late.) Perhaps someone will be able to solve this problem. The solution is not yet in sight.

In ulcerative colitis and familial polyposis, in order to remove all of the disease, the entire mucosa must be removed; you cannot leave any of it. If the rectum and colon are removed from above and just a millimeter of mucosa is left around the dentate line, whether or not it is diseased or has been, there will be recurrence and patients will have trouble until the mucosa is removed.

One other thing about patients with ulcerative colitis is that if the small intestine is subjected to any obstruction at all over a period of a few weeks (and all these patients are subjected to obstruction of the anal sphincters), the bowel dilates, becomes very large and the patients have agonizing cramps, ulceration and perforation with peritonitis, pelvic abscesses, etc.

We have some evidence to show that the small intestine of the patient with ulcerative colitis has some predisposition to ulcerate when obstruction is superimposed on it. That is another thing to consider.

Again, I would like to commend the authors for their efforts in continuing this investigation. Perhaps in the future some operation such as resection of the rectum and colon with pull-through technic and ileo-anal anastomosis will become practical.

Miguel A. Valiente (closing): As I tried to point out, in the dog the mobilization of the small bowel is not easy because of the configuration of the vascular supply. However, this problem is not present in humans. One can always mobilize the ileum sufficiently to bring it down to the anus.

In that respect, the operation in the human will always be able to be a pull-through of the ileum through the anus without any residual rectal mucosa. In patients with ulcerative colitis, which I imagine will be the greater number of patients who might benefit from this procedure, the whole mucosa has to be resected.

The works so far reported, especially by Drs. Ravitch, Wangensteen and Best, claim complete continence, not colon or pouch continence or any other type, but complete continence. There is a difference between a pull-through technic where the levator muscles have to be sacrificed for cases of cancer, and a pull-through where the whole sphincter mechanism can be preserved intact. Therefore the continence in the cases recorded by those who have performed the operation has been reported as complete and just the same as before operation.

The main complications reported up to now are frequency of bowel movements, excoriation of the anal and perianal skin due to the frequency of bowel movements, and anal fistulas and abscesses

by the same token, electrolyte and fluid imbalance, abdominal pain or cramps. None of the workers who have performed this operation have reported any instances of rupture or peritonitis from rupture.

Dr. Casanova-Diaz has performed a pull-through of the ileum in three cases. In one of them he incised the serosa and muscular coats longitudinally in the antimesenteric border of the ileum, and several circular incisions up to the mucosa with the intention of slowing down the motility of the bowel. In this instance he had very good results in that only a few movements occurred every day. Unfortunately, I do not know if the incisions in the serosa and muscular coats had anything to do with it or not. In this patient an abscess developed between the rectal shelf, which is preserved in all these cases after the mucosa has been excised, and the bowel. That was the only complication.

I believe that in humans this operation should be a little bit more effective than in animals because animals do not have sense to hold back the urge to defecate. For persons with the use of reason, they should be able to close that sphincter which has been preserved intact; the ileal contents will thus be stored in this pouch so that only a few bowel movements occur in one day and the complications may be greatly minimized.

It would actually mean so much for these persons that I think, as Dr. Turnbull pointed out, that anything which can be developed along this line would be a Godsend.

I would like to thank Dr. Turnbull for his very excellent comments on our paper.

Polyposis of the Large Intestine: Preservation of the Terminal Segment

WILLIAM G. SMITH, M.D. (*By Invitation*) AND RAYMOND J. JACKMAN, M.D.,
Rochester, Minnesota

From the Section of Proctology, Mayo Clinic and Mayo Foundation, Rochester, Minnesota. The Mayo Foundation is a part of the Graduate School of the University of Minnesota.

OVER the past ten to fifteen years two schools of thought have evolved regarding the optimal therapy for multiple polyposis. One school, favoring the complete extirpation of all polyp-forming mucosa, has preferred permanent ileostomy, colectomy and proctectomy in every case of multiple polyposis.[2,4] The other school has practiced, wherever feasible, preservation of a terminal segment of large bowel. Such preservation has been advocated only in the absence of carcinoma in the segment to be saved.[1,3] The decision to preserve the terminal segment of the bowel and avoid ileostomy has been predicated on the assumption that carcinoma can be prevented in this segment of the bowel by the eradication of all polyps initially present and by the periodic removal of all new polyps as they appear.

The subject material of this report is a series of cases of polyposis of the large bowel in which colectomy with preservation of a terminal segment was the treatment employed. All patients so treated, regardless of the severity of the polyposis, from January 1, 1933, to January 1, 1954, are included. This constitutes virtually the total number of patients treated in this manner at the Mayo Clinic up to January 1, 1954, since very few patients were so managed prior to 1933.

This paper is primarily concerned with problems in the management of the preserved terminal segment of the bowel and particularly with the occurrence of carcinoma in it.

CLINICAL FINDINGS

During the twenty-one-year period from January, 1933, to January, 1954, there were 159 cases in which the excessive formation of polyps in the large bowel presented a problem. One hundred fifty-five of these cases were of the variety usually designated as familial multiple polyposis; in the remainder, the problem of polyps was thought to be of sufficient magnitude to warrant extirpation of the colon. The disposition of these 159 cases is given in Table 1.

TABLE 1
DISPOSITION OF 159 CASES OF POLYPOSIS

Disposition of Case	Cases	
	No.	Per cent
No treatment given	26	16
Treatment refused	17	
Extensive neoplastic disease	8	
Lost to unrelated disease	1	
Colectomy with combined abdominoperineal resection	26	16
Carcinoma of rectum	24	
Confluent polyposis	2	
Colectomy with preservation of the terminal bowel	96	61
Segmental resection of colon with preservation of the terminal bowel	11	7
Total	159	100

Of the total patients seen, fifty-two either received no treatment or did not have the terminal segment of their large bowel preserved. The reasons for this are apparent in Table 1.

In eleven additional cases the terminal segment of the large bowel was observed or treated proctoscopically, but the more proximal bowel, for various reasons, received either limited or no surgical attention. Since these cases are few and their inclusion in the present study un-

necessarily complicates the presentation of data, they have been omitted.

The remaining ninety-six cases constitute the source material for this report. In all these cases, the primary intention was that of colectomy with preservation of a terminal segment of large bowel. Ten of the ninety-six patients died in the hospital. It should be pointed out that seven of these deaths occurred prior to 1940 in patients in whom a staged colectomy was planned. Of the total ninety-six patients, only thirteen were operated upon prior to 1940, the remaining eighty-three having been operated upon since. There were three hospital deaths in the latter group.

TABLE II
TYPES OF POLYPOSIS IN EIGHTY-SIX SURVIVORS OF OPERATION

Type of Polyposis	Cases	
	No.	Per cent
Typical multiple	59	68
Confluent or hyperplastic	10	12
Mild in terminal segment, typical multiple in rest of colon	13	15
Mild throughout colon	4	5
Total	86	100

Of the ninety-six patients under consideration, fifty were men and forty-six were women, with ages ranging from three to sixty-seven years. Ten patients were under the age of twenty years and twenty-four were over the age of forty. The remaining sixty-two patients fell into the age range twenty to forty years. The over-all average age was thirty-three years. Thirty patients had frank carcinoma (proximal to the terminal segment) at the time of operation.

Types of Polyposis. For the purpose of subsequent analysis, it is convenient to divide the eighty-six survivors of operation into types, depending mainly on the original distribution and severity of the polyposis. A division of the subject material into such types is presented in Table II.

In the typical multiple-polyposis group are included those cases in which there were more than thirty polyps within proctoscopic view and innumerable polyps studding the mucosa of the remaining large bowel. There were, however, areas of normal mucosa intervening between the polyps.

The confluent, or hyperplastic, group includes those cases in which polypoid transformation involved virtually all of the rectal and colonic mucosa within reach of the proctoscope, with few or no intervening islands of normal mucosa. The more proximal bowel showed extensive polyposis in all instances, but not necessarily confluent polyposis.

In thirteen cases the disease was relatively mild by proctoscopic examination but typical in the remainder of the colon. All cases with five polyps or fewer within proctoscopic reach and with typical multiple polyposis by roentgenologic examination were included in this group.

In four instances the disease was relatively mild throughout the colon and could hardly be called multiple polyposis. Cases with fewer than fifteen polyps throughout the large bowel were included in this group. Operation in these cases was performed either because the polyps present were scattered diffusely throughout the large bowel or because the patient had undergone numerous transcolonic excisions of polyps previously.

In two cases, multiple polyposis was diagnosed at proctoscopy in patients who had the typical picture in the terminal segment but whose proximal mucosa proved normal by air-contrast barium enemas. These cases have not been included in this study.

The Problem of Formation of New Polyps. It is well known that the initial clearing of polyps from the terminal segment by fulguration is not permanent and that in the majority of cases new polyps will form, since all of the polyp-bearing mucosa is not destroyed. In portions of the text to follow the terms "recurrent polyposis" and "polyp re-formation" are used frequently. It should be made clear that these terms refer to new polyps formed from a mucosa and epithelium that have an inherent neoplastic potential. The pattern of appearance of new polyps in the cleared terminal segment was studied from several approaches.

The over-all problem of new polyp formation was approached by selecting two groups of cases from all those with preserved terminal

segment. One group, totaling thirty-six cases, includes all those followed at the Mayo Clinic for at least five years after the initial fulguration. A second group, totaling thirteen cases, includes patients followed for more than ten years. These patients have not necessarily made a recent follow-up visit to the Mayo Clinic. Data on these groups have been analyzed with regard to the persistence and severity of polyp formation. The results of this analysis are given in Table III.

TABLE III
SEVERITY AND PERSISTENCE OF NEW POLYP FORMATION IN THIRTY-SIX SURVIVORS OF OPERATION

Severity and Persistence of New Polyp Formation	Patients Followed	
	>5 yr.	>10 yr.
Polyps fulgurated on more than ⅔ of postoperative visits	30	10
Polyps fulgurated on one of last two visits	33	11
More than 10 polyps on any one visit after 5 (10) yr	22	9
Total	36*	13

* Figure includes the thirteen patients followed more than ten years.

A further analysis of the types presented in Table II was made to determine if there was any correlation between the initial severity of the polyposis in the terminal segment and the severity of new polyp formation after the initial fulguration. An attempt was also made in this analysis to determine if the occurrence of carcinoma in the terminal segment were related to the severity of the initial polyposis or to the severity of the polyp re-formation, or to both. For the purpose of this analysis three classes (severe, moderate and mild) were arbitrarily set up to define the recurrent polyposis. Polyp re-formation was considered "severe" if more than an average of thirty polyps per year developed or if the patient had more than forty polyps on any one visit after two years following initial fulguration. It was considered "mild" if fewer than an average of five polyps per year developed and if the patient had no more than ten polyps on any one visit after two years. The "moderate" cases all fell between the limits of these two definitions. Only those patients followed more than two years after the initial fulguration were included in the analysis. The size of the polyps was not taken into consideration. The mere presence of polyps, regardless of size, would seem significant in any case of polyposis. It should be pointed out that these classifications are only approximations. The number of polyps fulgurated on each visit was, in many instances, an estimation on the part of the attending proctologist. The results of this study are presented in Table IV.

TABLE IV
TYPE OF POLYPOSIS, NEW POLYP FORMATION, AND CARCINOMA OF THE TERMINAL SEGMENT IN SURVIVORS OF OPERATION FOLLOWED MORE THAN TWO YEARS

Type of Polyposis*	Total Cases Followed (>2 yr.)	New Polyp Formation Considered		
		Mild	Moderate	Severe
Typical multiple	40	4	27	9
Carcinoma of terminal segment	5	1	3	1
Confluent	9	3	3	3
Carcinoma of terminal segment	1	0	1	0
Mild in terminal segment, typical multiple in rest of colon	5	5	0	0
Carcinoma of terminal segment	0	0	0	0
Mild throughout colon	2	2	0	0
Carcinoma of terminal segment	0	0	0	0

* Types subject to same definition as those in Table II.

Of the fifty-nine patients with a preserved terminal segment that fell into the "typical" group (Table II), forty were followed more than two years. Of these forty, nine might be classified as presenting severe problems in recurrent polyposis, twenty-seven as moderate and four as mild. (Table IV.) In one of the nine severe cases, three of the twenty-seven moderate cases, and one of the four mild cases carcinoma developed in the preserved terminal bowel. There were six cases of carcinoma of the terminal segment in the typical group; in the sixth case cancer developed before two years of follow up and therefore this case is not included in Table IV.

Of the thirteen patients in whom the rectal involvement was initially mild in cases other-

wise typical for multiple polyposis (Table II), five were followed more than two years. In all five cases polyp re-formation was mild. (Table IV.) There were no cases of carcinoma of the terminal segment developing in this group.

Of the four cases in which the involvement of the entire colon was mild, two were followed more than two years. Both fell into the "mild" group postoperatively so far as polyp re-formation is considered. There were no cases of carcinoma of the terminal segment in this group.

Of the ten cases of confluent polyposis, nine were followed more than two years. Of these nine, three showed severe, three showed moderate and three showed mild polyp re-formation. The one case of carcinoma which developed in this group showed only moderate re-formation of polyps postoperatively.

Time of Initial Fulguration in Relation to Surgery. In the absence of carcinoma in the large bowel proximal to the terminal segment, there is some divergence of opinion as to whether the initial fulguration should be performed before or after the major abdominal surgery. Unless one waits for a period of several months after such extensive fulguration as is usually necessary the bowel wall in the treated segment shows reactive inflammatory changes which jeopardize the chances for a good anastomosis. If one waits a sufficient period to allow such inflammatory changes to subside, the opportunity for early removal of the major fraction of the large bowel, with all its tumor-producing potential, is lost.

It is contended that fulguration performed after the anastomosis has been established saves time, since no bowel which will subsequently be excised need be tediously cleared by fulguration. As opposed to this argument, it is pointed out that it is often difficult or impossible to clear the bowel in the region of the anastomosis when this has been established first. This difficulty may be circumvented by excising the polyps in the region of the anastomosis at the time of surgery.

Since a really valid assessment of the optimal time for initial fulguration is difficult, a decision as to when to fulgurate is probably best left to the good judgment and preference of the individual surgeon.

In this series of cases, initial fulguration of the terminal segment was performed before ileosigmoidostomy in forty-two cases and after in forty-three cases. In one case no fulguration was necessary.

Complications of Fulguration. The complications to be discussed include those associated with postoperative periodic "check-up" fulgurations as well as those incident to the initial clearing of the bowel. As might be expected, complications were a little more frequent in association with the initial clearing, since in most cases more fulguration was done at this time than on subsequent visits.

It should be emphasized from the outset that in the vast majority of cases care of the terminal segment by fulguration has proved to be quite simple and unattended by complications.

In those cases in which surgery followed fulguration, the object of the primary fulguration was to clear the terminal 25 cm. of bowel. In the remaining cases the terminal bowel was cleared to the anastomosis.

The immediate complications of fulguration include hemorrhage and inflammatory changes in the bowel wall. These inflammatory changes tend to produce diarrhea, a mild systemic reaction with fever and malaise, and transient lower abdominal pain and tenderness indicative of peritoneal irritation. The chief late complication is that of scarring. It was formerly feared that repeated fulguration of the terminal segment might convert this into a functionless, rigid tube, leaving the patient with the equivalent of a perineal ileostomy. This fear has not been substantiated in fact.

In any discussion of the complications of fulguration, the confluent cases are best considered as a group distinct from the remainder. In virtually all instances of confluent or hyperplastic polyposis, colectomy with combined abdominoperineal excision of the rectum was considered the therapy of choice. In two instances this was actually performed, but in ten cases a decision was made to attempt salvage of the terminal segment. This decision was frequently in deference to the patient's wish. The complications incident to fulguration were of course more frequent in this group than in the non-confluent cases.

Of the ten confluent cases referred to, post-fulguration bleeding of sufficient degree to warrant notice occurred in five. In four of these instances the bleeding was quite mild and there was no appreciable drop in concentration of hemoglobin. In one instance only, hospitalization and blood transfusion (1,000 cc.) were

necessary. Signs of inflammatory changes in the bowel wall occurred in three patients. One of these three was hospitalized for three days with signs of peritoneal irritation. Extensive scarring with contracture and mild stricture formation occurred in two patients, but in both instances bowel function compared favorably with that of other patients undergoing ileosigmoidostomy.

In the remaining eighty-six cases (that is, non-confluent), the incidence of complications was much lower. Mild bleeding occurred in two cases without appreciable drop in concentration of hemoglobin. Very mild signs of inflammatory changes in the bowel wall developed in six cases. Hospitalization was not necessary in any. Excessive scarring with contracture and stricture did not occur in any.

It is an interesting addendum that diarrhea in excess of three or four bowel movements per day occurred in only two patients of the eighty-six survivors of operation. (Following colectomy and ileosigmoidostomy, with only 10 or 12 inches of remaining terminal large intestine, many patients will have six or more stools in twenty-four hours, but in three to six months this is usually reduced to one, two or three.)

Accessibility of Remaining Large Bowel. Adequate and complete proctoscopic visualization of the remaining large bowel is necessary if it is to be kept free of polyps. The type of anastomosis has been found to be the most important single factor determining the accessibility of all the preserved terminal segment. In thirty-six cases in which an end-to-end anastomosis was performed, no difficulty was encountered in visualizing and treating all the remaining large bowel. In the remaining cases, side-to-side, end-to-side and side-to-end (one case) anastomoses were performed. Whenever a lateral anastomosis is produced in the wall of a viscus, one or more blind pouches, depending on the exact type of anastomosis, are produced. In this series of cases, such pouches in the terminal segment frequently proved quite difficult to visualize. Further, the problem was occasionally compounded by the tendency of the pouch to dilate. Primarily because of inaccessibility, but also because of dilatation, further surgery for excision of this pouch was necessary in a few instances. Our experience with this problem is summarized in Table v.

In two instances in which excision of the pouch was necessary after side-to-side anastomosis, the pouch was tremendously dilated (12 and 15 cm. in length).

The one case of side-to-end ileosigmoidostomy is quite interesting. Prior to surgical excision, the dilated end of the terminal ileum had been detected roentgenologically and thought to represent a blind sigmoidal pouch with polyps. At surgery, 15 cm. of dilated ileum was removed; pseudopolyps of granulation tissue were found studding the mucosa.

TABLE V
ACCESSIBILITY OF REMAINING LARGE BOWEL ACCORDING TO TYPE OF ANASTOMOSIS (EIGHTY-SIX SURVIVORS OF OPERATION)

	Type of Ileosigmoidostomy			
	End-to-end	Side-to-side	End-to-side	Side-to-end
Blind pouch no problem	36	29	5	0
Blind pouch visualized and fulgurated with difficulty	0	10	0	0
Further surgery necessary for excision of blind pouch	0	5	0	1
Total	36	44	5	1

In three of the five cases of end-to-side ileosigmoidostomy, the type of anastomosis was incidental to the establishment of a retrograde sigmoid colostomy, the latter having been performed to assist in the proctoscopic clearing of the terminal segment.

In no instance has carcinoma developed in the blind pouch of a terminal segment.

Problem of Periodic Follow-up Care. If the assumption is correct that carcinoma can be prevented in the preserved terminal segment by the eradication of new polyps as they appear, then part of the responsibility for postoperative cancer prophylaxis falls on the patient. Successful postoperative care depends, in large measure, on the patient's returning as instructed for periodic proctoscopic examination.

All patients in this series were instructed to return at intervals varying from three months

to a year. An attempt was made to assess how faithfully these instructions were followed and to determine if the incidence of carcinoma in the terminal segment was any higher among those patients who failed to follow directions than among those who followed them.

Any patient not seen or heard from during the period July 1, 1953, to January 1, 1955, was considered lost to follow-up. There were four such patients among the eighty-six survivors of operation. Of these four, however, correspondence antedating July 1, 1953, indicated that in two patients carcinoma had developed in the preserved bowel. An assessment of the adequacy of follow-up care in these two patients is not possible on the basis of available information.

Of the remaining eighty-two patients on whom follow-up is considered complete, fifteen have had most or all of their postoperative care at other clinics. No case of carcinoma in the preserved bowel has appeared among these fifteen.

Sixty-seven patients received all their postoperative care at the Mayo Clinic. Thirty-six of these sixty-seven were found to have returned for periodic check-up examinations exactly as instructed. Carcinoma of the terminal segment developed in three of these patients. Thirteen patients were occasionally delinquent, but in spite of their delinquency received what might be considered adequate care. Carcinoma of the preserved segment developed in one of these patients. The remaining eighteen patients ignored instructions, returning only at widely spaced intervals for check-up examinations. Carcinoma of the terminal segment developed in one of these.

It is difficult to draw any conclusions from the foregoing observations. That the incidence of carcinoma should be roughly the same regardless of the quality of the postoperative care is offensive to sound reason. The results are possibly attributable to the small size of the series.

The interval between the last proctoscopic examination and the recognition of carcinoma in the terminal segment is of some importance in establishing an optimal follow-up period for these patients. This interval was found to be three, eight and twelve months in the three patients who followed instructions rigidly. It was eighteen months in the patient who received only "adequate" care and thirty-four months in the patient who ignored instructions completely. The one instance in which carcinoma developed in the short span of three months involved a patient who originally had confluent polyposis. On the basis of this information, it is believed that follow-up intervals of six to nine months should be adequate except in those cases in which the polyposis is initially quite severe or the formation of new polyps is especially rapid.

The time elapsing between the initial operation for polyposis and the subsequent development of carcinoma in the preserved segment is of some significance. Considered in the same sequence as in the paragraph immediately preceding this, these patients were found to have carcinoma of the rectum or sigmoid at seven, one, thirteen, seven and one-half and five years postoperatively, respectively. In the two instances in which carcinoma developed in the terminal segment in patients who received postoperative care at other clinics, this time is known to be four and fifteen years.

RESULTS

The over-all results in the eighty-six survivors of operation are best considered in terms of the period the patients have been followed. This is done in the paragraphs to follow. It should be kept in mind that of the eighty-six patients under consideration, thirty had frank adenocarcinoma in the resected proximal bowel at the time of colectomy. The case histories of the seven patients in whom carcinoma was found to have developed in the preserved terminal bowel are presented in detail following the breakdown of cases according to the time of the original operation.

Patients who have been neither seen at the clinic nor heard from during the period July 1, 1953, up to January 1, 1955 (when follow-up letters were sent out), have been considered lost to follow-up in the ensuing tabulated results.

As previously mentioned, only thirteen patients were operated upon prior to January 1, 1940, and of these thirteen, six survived operation. Carcinoma has developed in the preserved terminal bowel in two of these six patients. Both patients were treated surgically. One of these two patients is known to have died from metastatic carcinoma of the rectosigmoid. Except for the fact that carcinoma is known to have developed in the terminal segment and to have received surgical attention, the other

patient has been lost to follow-up since the original operation. The remaining four patients in this group are living and well.

Twelve of the eighty-six survivors of operation had undergone colectomy and ileosigmoidostomy between January 1, 1940, and January 1, 1945. Carcinoma has developed in the preserved terminal bowel in two of these. Both were treated surgically. One of these two is living and well. The second is living but sick. Of the remaining ten patients in this group, two are dead of metastatic carcinoma of the excised proximal bowel and eight are living and well. One of these eight has been followed primarily at another clinic.

Of the thirty-four patients who had survived surgical treatment between January 1, 1945, and January 1, 1950, carcinoma has developed in the preserved terminal bowel in three. Two of the three were treated by fulguration and one was treated surgically. One of the three is living and well and another is known dead, presumably of metastatic carcinoma. With the exception of the fact that carcinoma is known to have developed in the preserved bowel and to have been treated by fulguration, the third patient has been lost to follow-up since the original operation.

Of the remaining thirty-one patients in the 1945 to 1950 group, one has been lost to follow-up, twenty-seven are living and well, and three are known dead. Nine of the twenty-seven living and well were followed primarily at other clinics. The three deaths in this group were attributable to persistent carcinoma of the excised proximal bowel.

Of the thirty-four patients surviving operation between January 1, 1950, and January 1, 1954, none has yet developed carcinoma in the preserved terminal bowel. One patient has been lost to follow-up. Of the remaining thirty-three patients in whom complete follow-up information is available, thirty are living and well and three are known dead. Four of the thirty living and well were followed primarily at other clinics. The three deaths in this group were attributable to persistent carcinoma of the excised proximal bowel.

CASE REPORTS

The pertinent facts about the seven patients in whom carcinoma developed in the preserved terminal bowel are presented below.

CASE I. The patient was a married woman, aged twenty-nine years. Staged colectomy, with preservation of the terminal large bowel, and side-to-side ileosigmoidostomy were performed in 1933 for typical multiple polyposis. The rectum, sigmoid and colon were free of carcinoma at the time of operation. This patient did not return for periodic examinations at the clinic and was essentially lost to follow-up after her convalescence from operation. The type of care given the terminal bowel is not known. The only follow-up information available is a letter from her physician stating that a carcinoma of the rectum was found in 1948, fifteen years after the original operation. It was treated by combined abdominoperineal resection and ileostomy. Further follow-up information is not available.

CASE II. The patient was an unmarried woman, aged thirty-nine years. Colectomy, with preservation of the terminal bowel, and side-to-side ileosigmoidostomy were performed in 1939 for typical multiple polyposis. The patient returned very faithfully for periodic proctoscopic examinations and fulgurations. In 1952, thirteen years after the original operation, a carcinoma was found in the preserved terminal segment at 18 cm. proximal to the dentate margin. The patient's last proctoscopic examination had been at the clinic twelve months before the diagnosis of carcinoma was made. Low anterior resection was performed. The patient died one and one-half years later of persistent carcinoma.

CASE III. The patient was a man, aged fifty-two years. Colectomy, with preservation of the terminal bowel, and side-to-side ileosigmoidostomy were performed in 1942 for typical multiple polyposis complicated by two carcinomas, one of the ascending and another of the descending colon. The rectum and sigmoid were free of carcinoma at the time of operation. The patient ignored instructions regarding postoperative proctoscopic examinations and the care of the preserved bowel was therefore considered grossly inadequate. In 1947, five years after the original operation, carcinoma was found in the preserved terminal segment at 16 cm. proximal to the dentate margin. The patient's last proctoscopic examination had been at the clinic thirty-four months before the diagnosis of carcinoma was made. Combined abdominoperineal resection was performed. The patient was living and well in January, 1955.

CASE IV. The patient was a man, aged thirty-four years. Colectomy, with preservation of the terminal large bowel, and side-to-side ileosigmoidostomy were performed in 1944 for multiple polyposis demonstrating confluence on proctoscopic examination. The rectum, sigmoid and colon were free of carcinoma at the time of operation. The patient returned very faithfully for periodic proctoscopic examinations and fulgurations. In 1951, seven years after the original operation, carcinoma was found in the preserved terminal segment at 8 cm. proximal to the dentate margin. The patient's last proctoscopic examination had been at the clinic three months before the diagnosis of carcinoma was made. Combined abdominoperineal resection was performed. Follow-up correspondence in January, 1955, indicated that the patient was living but was sick and unable to work.

CASE V. The patient was a married woman, aged twenty-four years. Staged colectomy, with preservation of the terminal large bowel, and side-to-side ileosigmoidostomy were performed in 1946 for typical multiple polyposis complicated by two carcinomas, one of the descending colon and another at 15 cm. proximal to the dentate margin. The distal 15 cm. of large bowel was free of carcinoma at the time of operation. The patient returned as instructed for periodic proctoscopic examinations and fulgurations. In 1947, one year after the original operation, carcinoma was found in the preserved terminal segment at 6 cm. proximal to the dentate margin. This was a new carcinoma, not persistent carcinoma at the site of anastomosis. The patient's last proctoscopic examination had been at the clinic eight months before the diagnosis of carcinoma was made. Combined abdominoperineal resection and ileostomy were performed. The patient died four years later, presumably of persistent carcinoma.

CASE VI. The patient was a married woman, aged thirty-eight years. Colectomy, with preservation of the terminal large bowel, and side-to-side ileosigmoidostomy were performed in 1946 for typical multiple polyposis. The rectum, sigmoid and colon were free of carcinoma at the time of operation. The patient was occasionally delinquent in her follow-up visits, but in spite of this she received what was considered adequate care. In 1953, seven and one-half years after the original operation, carcinoma was found in the preserved terminal segment immediately proximal to the dentate margin. The patient's last proctoscopic examination had been at the clinic eighteen months before the diagnosis of carcinoma was made. Because of the patient's previous difficulty with desmoid of the abdominal wall which had recurred many times, it was decided to treat the lesion by fulguration. The patient was living and well one year after completion of treatment.

CASE VII. The patient was a married woman, aged twenty-eight years. Colectomy, with preservation of the terminal large bowel, and end-to-end ileosigmoidostomy were performed in 1947 for typical multiple polyposis. The rectum, sigmoid and colon were free of carcinoma at the time of operation. Following convalescence from the operation, the patient was essentially lost to follow-up. She was seen at the clinic, however, on two subsequent occasions, both approximately four years later. Correspondence from her physician at the time of these visits indicated that carcinoma had recently been found in the preserved bowel 10 cm. proximal to the dentate margin. It had been treated by fulguration. Further follow-up information is not available.

COMMENT

Except in those cases in which polyposis was initially mild in the terminal segment, there seems to be no strict correlation between the severity of the original polyposis and the severity and persistence of polyp re-formation. (Table IV.) One might reasonably suspect all cases of confluent polyposis to show a marked tendency to re-form polyps. Whereas this was true in approximately one-third of the relatively few confluent cases in this series, it was not true in the remainder. Most patients in the typical group showed a moderate tendency to re-form polyps, and yet there were an appreciable number who showed marked recurrent polyposis. Only in those cases in which the polyposis was originally mild in the terminal segment did this persist over into the postoperative period.

One might reasonably anticipate that polyps would continue to re-form in appreciable numbers in the preserved terminal segment for the remainder of a patient's life. That this is essentially true is indicated in Table III.

The attempts made in the analysis of data on this series of cases to correlate the occurrence of carcinoma with the severity of the original polyposis or with the severity of polyp re-forma-

tion show some unexpected results. On the basis of a few cases, it would seem about as safe to preserve the terminal segment in confluent polyposis as in the typical variety. Again on the basis of a relatively few cases, there would seem to be a large factor of safety in preserving the terminal bowel in those cases in which the involvement of this segment is mild from the outset.

Apparently the degree of polyp re-formation cannot be used as an indicator of the danger of carcinoma. Cancer occurred in some cases whether the recurrent polyposis was mild, moderate or severe. (Table IV.) This observation, however, is perhaps specious to the extent that it includes no consideration of the fact that those cases with severe recurrence of polyps were always watched at closer intervals than others.

What are the practical applications of the foregoing observations? The follow-up care of these patients is directed primarily at the prevention of carcinoma in the terminal bowel, and follow-up intervals ought to be dictated by the danger of development of such cancer. If this danger entirely paralleled the severity and persistence of re-formation of polyps, follow-up care might be individualized depending on the pattern of recurrent polyposis in each case. Since, however, carcinoma seems to develop in some cases whatever the nature of this pattern, one can only conclude that follow-up intervals should never be longer than six to nine months, even though few polyps re-form between visits. Where the rapid recurrence of polyps demands, this interval should be shortened to three to six months. Although severe recurrent polyposis was not responsible for many carcinomas in this series, it should be pointed out that patients with severe recurrent polyposis were carefully checked every three to six months. It seems difficult to believe that in the absence of such careful watching the rapid polyp formers would not have produced more carcinomas. Finally, since polyps persistently appear and cancers may develop even after long years of care, follow-up visits and examinations must persist throughout the patient's lifetime. Impressing patients with this fact can be one of the most difficult facets of their postoperative care.

The success of any program aimed at salvaging the terminal segment is measured primarily in inverse ratio to the number of patients in whom carcinoma develops in that segment after the remainder of the large bowel has been removed. Of those in whom carcinoma does develop, it is important to know how many may be successfully treated. The assumption has been that with careful periodic check-ups, radical surgery, if necessary, may be instituted early and successfully in a high percentage of cases. This assumption has actually been tested too few times to assess its validity. Other considerations seem secondary and of little, if any, importance. The functional result of ileosigmoidostomy is good in the vast majority of cases. This seems to be true even after extensive fulguration.

One may well ask what the incidence of carcinoma of the preserved terminal segment is among the patients in this series. The over-all figure of 8.1 per cent is meaningless, since the series is heavily weighted by patients who have undergone operation in relatively recent years. Carcinoma does not seem to develop in the preserved bowel in the years immediately following operation—at least not in most instances observed to date. Whatever the incidence may ultimately prove to be, the program of treatment discussed in this paper might be condemned if the alternative form of therapy were without hazard. The fact remains, however, that ileostomy retains many formidable aspects in spite of much that has been learned about it. Its long-term mortality may exceed that which will be ultimately noted in this series of patients.

CONCLUSIONS

1. Preservation of a terminal segment of bowel in multiple polyposis is attended by some risk in terms of development of carcinoma and of subsequent mortality from such carcinoma. This risk is believed justifiable when one considers the risk attending the alternative form of treatment.

2. Patients with a preserved terminal segment must be impressed with the gravity of the disease and with the importance of faithful observance of periodic proctoscopic examination. Successful cancer prophylaxis depends in large measure on their cooperation.

3. Periodic follow-up examinations should be no more than six to nine months apart at most and should persist a lifetime. The length of the follow-up interval should be determined by the ever-present danger of cancer and by the severity of the recurrent polyposis.

4. The terminal segment is easily and safely

cleared of polyps by fulguration. Periodic examinations of the terminal segment are greatly facilitated by an end-to-end anastomosis.

REFERENCES

1. Black, B. M. and Hansbro, G. L. Symposium on abdominal surgery; the treatment of familial polyposis of the colon. *S. Clin. North America*, 30: 1013–1023, 1950.
2. Cattell, R. B. Surgical treatment of polyps of the large intestine. *Am. J. Surg.*, 76: 733–747, 1948.
3. Mayo, C. W., DeWeerd, J. H. and Jackman, R. J. Diffuse familial polyposis of the colon. *Surg., Gynec. & Obst.*, 93: 87–96, 1951.
4. Moore, S. W. Polyps of the large intestine. *Am. J. Surg.*, 82: 390–395, 1951.

DISCUSSION

Walter A. Fansler (Minneapolis, Minn.): I wish to congratulate Drs. Jackman and Smith upon this most excellent and timely presentation. This group of patients probably represents the largest number of such cases thus far personally observed and is large enough to permit some definite inferences.

While in some quarters colectomy is being advocated for a single polyp of the colon, it is pleasant to have it pointed out that total colectomy may not be to the best interests of the patient.

I agree that almost without exception in cases of multiple polyposis, even the familial type, the operation of choice is colectomy with anastomosis of the ileum to the terminal portion of the large bowel. That an occasional carcinoma may develop in the remaining segment is admitted. When this is weighed against other factors, however, I do not consider it a valid reason for routine coloproctectomy. There were seven cases of carcinoma developing later in the series reported by Drs. Jackman and Smith, only two of which required radical surgery. It was not stated whether neglect of follow-up examinations on the part of the patient was responsible for the necessity of such radical procedure in these two cases.

It is of fundamental importance that frequent examinations be continued as long as the patient lives. It should be impressed upon the patient that only by so doing may he avoid fatal carcinoma and that such examinations are the price he must pay for avoiding ileostomy. If these examinations are done frequently, any carcinoma should be found in its incipient stage in which in most cases fulguration should still be adequate treatment. This was the case in five of the cases of carcinoma just presented.

There can be no rule of thumb in all cases as to whether the polyps in the terminal bowel should be fulgurated before or after colectomy. There are two situations in which colectomy should precede fulguration: (1) those cases in which there is definite carcinoma in the colon; and (2) those cases in which proctoscopic examination shows sufficient normal bowel to allow anastomosis without involving any polyps in the suture line. Other cases must be considered individually.

In conclusion I wish to call attention to two points in operative procedure which I think are important. In the cases just presented the type and site of anastomosis varied considerably. This was no doubt due to the fact that the operations were performed by several surgeons of diverse opinions. Unless there are complicating factors there is an ideal type of anastomosis and an ideal site for anastomosis. The proper type of anastomosis is end-to-end; the difficulties encountered with other types have been pointed out. The ideal site for anastomosis is the peritoneal reflection or just above and not at higher bowel levels as were described in some of the cases in the series presented. There are two advantages in performing the anastomosis at the peritoneal reflection and leaving this shorter residual segment of bowel. One is that this short segment may be subsequently visualized very easily and with very simple equipment. Regardless of their promises, many patients from distant points do not return for frequent check-up examinations. This neglect may be tragic. On the other hand they will usually see their local doctor regularly and with a short residual section of bowel to examine the doctor is able to advise them as to the presence or absence of polyps.

The second point is that with the anastomosis done at the peritoneal reflection the remaining segment of bowel is extraperitoneal. This is of particular importance in later fulgurations. The surgeon can fulgurate with confidence even to charring completely through the bowel wall without worry as to perforation of the peritoneal cavity.

William G. Smith (closing): I would like to express agreement with Dr. Fansler as far as the difficulty concerned in getting patients to come back for follow-up studies. It is a problem. It has been the practice heretofore at the clinic to advise patients to return usually at intervals of nine months to a year. In many instances they have not been faithful. In some cases in which the patient was not faithful to follow-up examination, carcinoma developed.

Also I would like to say that in seven cases in which carcinoma developed, there were complete follow-up examinations on five patients. In these cases the interval between the last visit and the diagnosis of carcinoma was three, eight, twelve, eighteen and thirty-four months. The shortest interval, therefore, was three months, which is pretty short. However, this particular patient had confluent polyposis initially. On the basis of the other figures, we believe that probably six to nine months is an adequate follow-up interval.

Minimization of Risk and Disability in Idiopathic Ulcerative Colitis

CLARENCE DENNIS, M.D. (*By Invitation*) AND KARL E. KARLSON, M.D. (*By Invitation*),
Brooklyn, New York

From the Department of Surgery, State University of New York College of Medicine at New York City, and the University Division, Kings County Hospital, Brooklyn, New York.

FEW gastroenterologic diseases exist which are more prone than idiopathic ulcerative colitis to lead to disaster as a consequence of errors in management, whether medical or surgical. Surgical intervention enjoys favor in numerous centers today, but is still rigorously avoided by many internists. It is to be hoped that our increasing knowledge concerning surgical intervention will lead to a broader general conviction that this course, in truth, offers a more secure outlook than overextended conservatism.

In order that this appreciation may be broadly accepted, it is essential that surgeons (1) reserve operative intervention for fully supportable indications, (2) make a choice of operative procedure which is safest and least disabling to the patient, and (3) conduct the surgical care in such manner as to minimize disability and risk.

BASIS FOR CONCLUSIONS

After we left the University of Minnesota to go to the State University of New York in 1951, we published a review of those cases seen at the University of Minnesota Hospitals from 1934 to 1951, and at the Minneapolis General Hospital from 1947 to 1951.[1] There were 267 cases. Of the patients who came to the University Hospital for care, a considerable share were referred and thereby differed from those cases usually seen in general practice. Of the patients coming to the University Hospitals for care, 61 per cent underwent surgical management as a relatively elective procedure; 39 per cent either had no surgical operation performed, or surgical intervention was withheld until such time as it had become a rather heroic gesture, as for instance, after perforation of the colon with acute peritonitis. In general, however, those patients coming to surgical operation were the sicker group of patients.

Of that group treated without operation or with operation deferred until undertaken as an acute emergency, only 29 per cent of those followed were alive in 1951, and only 27 per cent of these survivors were free of symptoms. Of that group treated with the aid of surgical intervention, 80 per cent of those followed were alive in 1951, and 91 per cent of those followed and alive were active and well.

In other words, of the group treated conservatively, or with only emergency surgery, 7.7 per cent of those followed were found living and well at the end of the follow-up period; of the group treated with elective operation, 72.8 per cent of those followed were found living and well at the end of the follow-up period.

CANCER AS A COMPLICATION OF IDIOPATHIC ULCERATIVE COLITIS

In the series referred to, the chief cause of death was the development of cancer, in addition to colitis proper in the acute or fulminating stage and surgical misfortunes. In this study group, in those patients with a ten-year history of colitis who retained the colon, cancer developed as a complication in a little more than 10 per cent. Since publication of our work in 1952[1] two additional cases of carcinoma complicating idiopathic ulcerative colitis have come to light among patients seen during the study period at the University of Minnesota Hospitals. It would appear that the risk of carcinoma rises as the duration of the disease exceeds ten years, and the data are consistent with the supposition that in each case in which the colon was retained more than ten years after the onset of ulcerative colitis there

is a risk of about two-thirds of 1 per cent in each individual year of carcinoma developing in that colon. Others have reported still higher incidences in late ulcerative colitis. For instance, Lahey[2] indicated a malignancy rate over 30 per cent in patients who have had the disease for ten years or more and who were colectomized. Counsell and Dukes[3] reported an incidence of nearly 50 per cent after ten years.

TABLE 1*

NON-NEOPLASTIC COMPLICATIONS OF IDIOPATHIC ULCERATIVE COLITIS

Perforation of colon		10 (3.7%)
Perianal abscess		8 (3.0%)
Fistula-in-ano		4 (1.5%)
Rectovaginal fistula		3 (1.1%)
Ileocolic fistula		2 (0.8%)
Massive hemorrhage†		4 (1.5%)
Liver abnormalities‡		50 (18.7%)
Cirrhosis	12 (4.5%)	
Atrophy	2 (0.8%)	
Lesser abnormalities	14 (5.2%)	
Abnormal function tests	22 (8.2%)	
Arthritis§		19 (7.1%)
Thromboembolic disease		20 (7.5%)
Fatal pulmonary embolism	10 (3.7%)	
Pyoderma		9 (3.4%)
Cholelithiasis		6 (2.2%)
Nephrolithiasis		3 (1.1%)

* Table reproduced from *Surgery*, 32: 892, 1952.[1]

† One fatal.

‡ Six patients (2.2 per cent) died of liver failure; report on liver biopsy is in preparation with Dr. F. W. Hoffbauer.

§ Ninety-two per cent having surgical therapy improved after operation.

The lethal character of carcinoma complicating idiopathic ulcerative colitis is made apparent by a review of data available in the literature and by our own series. In our series, only one of sixteen patients who had had carcinoma complicating colitis was alive at the end of the study period. No late report on this patient is available. Lahey reports two survivors of eighteen patients, but both had had the diagnosis of carcinoma made by careful microscopic examination after colectomy, and the diagnosis of carcinoma had not been established prior to operation. Shands et al.[4] found only one of seventy-three patients who had had carcinoma complicating colitis alive and well after five years. Others[5,6] have noted similarly distressing figures.

A particularly disturbing aspect of carcinoma as a complication of colitis is that the patients who have long-standing ulcerative colitis have become accustomed to such symptoms as diarrhea, abdominal cramps, occasional bouts of distention, fever, and blood in the stool. The occurrence of these symptoms, therefore, does not serve as a danger signal as it does to patients not already suffering from ulcerative colitis.

In addition in cases in which the disease has been present for a great period of time the advanced stage of fibrosis, usually present in the colon, masks x-ray signs of cancer as well.

These considerations support the thesis that cancer alone, without consideration of the other complications of idiopathic ulcerative colitis, should serve as a very real stimulus to consideration of colectomy in long-standing cases.

Other complications of this disease which were seen in the study reported in 1952 are indicated in Table 1.

TYPES OF SURGICAL INTERVENTION

In our opinion, but two types of surgical intervention are regularly appropriate in the management of this disease. The first of these is vagotomy and the second is pancolectomy with ileostomy.

Vagotomy. In 1947, Eddy and Dennis et al.,[7] undertook to evaluate the part which vagotomy might play in the management of idiopathic ulcerative colitis. This maneuver was suggested to us by Dr. C. J. Watson, Chief of Medicine at the University of Minnesota Hospitals. Our initial results were most encouraging, and therefore this procedure was utilized in a series of forty-two patients. A careful follow-up, carried out by Eddy,[8] suggests the best responses occurred in those cases without appreciable fibrosis of the colon, without massive hemorrhage and without extremely extensive ulceration.

Nearly half of the entire group appears to have derived some rather long-lasting benefit from the procedure. On the other hand, many of those patients who underwent vagotomy and showed very strikingly favorable results in the immediate postoperative period have ultimately come to further definitive surgical operation upon the intestinal tract. More than one-third of those in whom vagotomy was done as a primary procedure have now undergone total colectomy.

Gastric retention occurred in more than 10 per cent of the patients who underwent vagotomy, and it therefore seemed desirable

to perform a parasympathetic block which might be removed when desired. The introduction of banthīne® by Grimson appears to have made possible such transitory parasympathectomy and this drug has proved highly effective. It must be given in twenty-four hour dosage sufficient to interfere with ocular accommodation. The only indication now remaining for the performance of transthoracic vagotomy is the patient who has involvement of the entire small intestine as well as of the colon, in whom the colon and the worst of the involved area of small intestine have been removed. In a small number of such cases this course has thus far been very gratifying.

Primary Colectomy. Until the suggestion of Wangensteen and Toon,[9] and Miller, Ripstein and Tabah[10] that primary colectomy might be safer than preliminary ileostomy and subsequent colectomy, ileostomy was done as the initial operation. In our hands, ileostomy alone carried a mortality rate in excess of 10 per cent, with an additional mortality rate of 10 per cent arising from other factors, such as carcinoma, cirrhosis, hemorrhage and death on the way to the operating room. Assembly of all available data from Miller, Ripstein and Tabah, and Wangensteen and his associates would suggest that the mortality rate is under 5 per cent for this procedure. Addition of primary proctectomy with primary subtotal colectomy has not increased the mortality rate in our hands.

Colectomy with ileoproctostomy was employed by Wangensteen and his associates in forty-one cases;[1,9] it is more risky than colectomy and ileostomy and is usually not socially acceptable. There were no successes in four ileo-anal pull-through procedures.

Indications for colectomy in idiopathic ulcerative colitis: The indications for colectomy are as follows: (1) Fulminating colitis which fails to respond within days to good medical management, including banthīne. (2) Acute colitis which cannot be brought under control within approximately a month of onset. (3) Colitis which advances the degree of damage and fibrosis of the colon to a stage in which malignant degeneration is difficult to recognize. (4) Chronic colitis of more than five years' duration (cancer risk). (5) Colitis with complications of serious or uncontrollable nature: (*a*) perforation; (*b*) carcinomatous degeneration, proved or suspected; (*c*) cirrhosis of the liver; (*d*) secondary arthritis; (*e*) secondary pyoderma.

PROGNOSIS FOR PATIENTS WHO HAVE UNDERGONE TOTAL COLECTOMY AND ILEOSTOMY FOR IDIOPATHIC ULCERATIVE COLITIS

In a group of eighty-eight patients followed for periods up to ten years after dismissal from the hospital following colectomy and ileostomy three deaths have occurred from metastatic carcinoma and one from lymphatic leukemia. All others patients in this group are alive and all but seven are apparently in good health. This is in sharp contrast to the death of one patient in three followed five years without surgical intervention.

PROPER SURGICAL TECHNIC FOR ULCERATIVE COLITIS

Except for carcinoma, arthritis, cirrhosis and other complications of ulcerative colitis which antedate surgical therapy, the morbidity following surgical intervention for colitis usually falls into one of two groups. The first of these has to do with familiar surgical complications which are risked in any operation, such as wound infection, pulmonary atelectasis, urinary tract infection, pulmonary embolism and so forth. The second includes complications peculiar to the procedure, such as cutaneous excoriation, ascending enteritis in the small intestine, stenotic ileac orifice, fistula about the ileostomy, prolapse of the ileostomy, and retraction or herniation of the ileostomy. These latter are usually outgrowths of poor surgical management. Loss of sexual power or delayed healing of the perineum usually result from unnecessarily wide excision of the rectum.

Construction of an Ileostomy. The considerations for establishing a good ileostomy are sixfold.

1. *Choice of incisions:* As pointed out by one of us in 1945,[11] skin-to-skin approximation heals badly when bathed in drainage from an ileostomy. Skin-to-serosa, on the other hand, appears to heal very satisfactorily. Therefore, a single barreled ileostomy should be made with the bowel brought through a circular skin incision just large enough easily to admit one's thumb. Tissues from all thicknesses of the abdominal wall should appropriately be removed in similar fashion, sparing only the subcutaneous fat. The position of such a circular incision appears to be most satisfactory in the belt line, perhaps 3 or 4 cm. to the right of the midline. It should be at least 7 cm. away

from the main laparotomy incision and it must be far enough away from the bony prominences and the crease of the groin so that vigorous exercise by the patient will not lead to loosening of the bag from the abdominal wall and secondary soiling of the skin by contents from the ileum.

In our hands, the most satisfactory main incision is a left paramedian from the pubis to a point half-way between the umbilicus and the costal margin.

2. *Utilization of healthy ileum to make the ileostomy:* As reported by us in 1952,[1] it has been possible to be precise in determining the extent of involvement of the terminal ileum only upon microscopic examination. Gross examination of the serosal surface, gross examination of the mucosal surface and efforts to evaluate the status of the bowel by palpation have proved to be misleading and productive of difficulties with the ileostomy subsequent to operation.

The importance of the selection of the lowest level of good ileum as the site for construction of the ileostomy can hardly be overestimated. It is the last portion of the small intestine which normally absorbs the vast bulk of the 6 to 10 L. of fluid which daily pass the ligament of Treitz in the normal adult. Unnecessary removal of this terminal segment results in difficulties in adequate nutrition, as Kremen et al.[12] have shown, and in addition leads to a liquid discharge from the ileostomy which is not only difficult to handle and keep from escaping from the ileostomy bag, but which is also endowed with a great deal of proteolytic digestive capacity rendering the skin subject to extreme excoriation.

Placement of the ileostomy level in involved intestine is similarly disadvantageous. This segment of intestine apparently exudes a large volume of liquid transudate which makes fluid economy by the patient difficult. In addition the diseased intestine appears to heal less satisfactorily and thereby gives rise to increased frequency of prolapse, herniation beside the ileum and retraction with skin level stenosis.

3. *Attachment to abdominal wall:* Secure attachment of the ileum and mesentery to the posterior rectus sheath and peritoneum is essential to regular prevention of herniation beside the ileum through the abdominal wall, without which prolapse and retraction do not occur. Use of fine silk sutures (No. 0000), placed so as not to include mucosa or cause strangulation of the tissue, is apparently effective in avoidance of formation of a fistula. Sutures are usually twelve to fourteen in number and placed with the same care and gentleness as in intestinal anastomosis.

4. *Formation of mesenteric diaphragm:* The anchorage of the terminal ileum to the anterior abdominal wall in construction of a terminal ileostomy creates a situation in which strangulation of other intestine about that segment can take place. In the author's experience this has been observed four times in ileostomies and twice in colostomies. In the last four such instances the situation has been recognized and the patients salvaged. The risk of this calamity is easily avoided by fashioning a diaphragm of the mesentery of resected terminal ileum or ascending colon to close off the space from the terminal ileum to the anterior, lateral and posterior abdominal walls to the right of the ileostomy. In those instances in which insufficient mesentery is present for the purpose, a flap of peritoneum from the lateral abdominal wall may be turned down to fashion such a diaphragm.

5. *Skin attachment:* Most colitic patients gain considerable weight after colectomy and ileostomy, and much of this weight consists of an increase in the amount of subcutaneous fatty tissue. If, therefore, the ileum is allowed to heal to the skin as it lies naturally at the time of ileostomy, the ileum will acquire skin attachment in such fashion that this gain of subcutaneous tissue will lead to funneling of the skin down to the mucocutaneous junction of the ileostomy. Excoriation of the skin, chronic inflammatory reaction and contracture result and, therefore, stricture of the ileostomy at the skin level, combined with a great deal of disability for the patient, occurs. In prevention of this complication, it has proved workable and effective to provide an extra amount of ileum in the subcutaneous position. In order to assure this slack ileum, the skin margin is sutured to the intestine while elevated, so as to provide an extra centimeter or centimeter and one-half of ileum below the skin level. This attachment has been readily accomplished with eight or ten carefully placed No. 0000 silk sutures.

6. *Coverage of the projecting stoma:* For many years peritonitis of the projecting stoma was prevented by closure of the end of the ileum

and drainage of this segment for a week with a catheter through the line of closure.[11] This is cumbersome, time-consuming and an added expense and discomfort to the patient. This situation can be managed by the split-thickness skin graft recommended by Dragstedt et al.,[13] by the mucosal graft recommended by Crile and Turnbull[14] or by the method of everting the entire thickness of the ileac wall as recommended by Brooke,[15] of England. In the authors' experience, the split-thickness skin graft has given rise to complications, such as stricture and fistula formation at the skin level, and a rather rigid ileostomy which is a source of great discomfort to the patient in case of accidental blows to this area of the abdomen. We have not utilized the mucosal graft of Crile and Turnbull because Mr. Brooke had previously pointed out his method to one of us and we had been delighted with the simplicity and effectiveness of it. The bowel is everted after attachment to the skin, a sufficient length being provided outside the skin so that the projecting ileum after eversion is approximately 2 cm. in length. The cut edge of intestine is then also sutured to the skin margin. This provides a flexible, non-tender, non-stenosing type of ileostomy orifice.

Our present manner of ileostomy construction is illustrated in Figure 1.[16] Construction of the ileostomy as described, and in conjunction with colectomy, is followed regularly by freedom from postoperative cramps and by discharge of semi-formed stool in four to five days. Measurement for the Koenig-Rutzen bag, the most satisfactory in our opinion, should be deferred three weeks.*

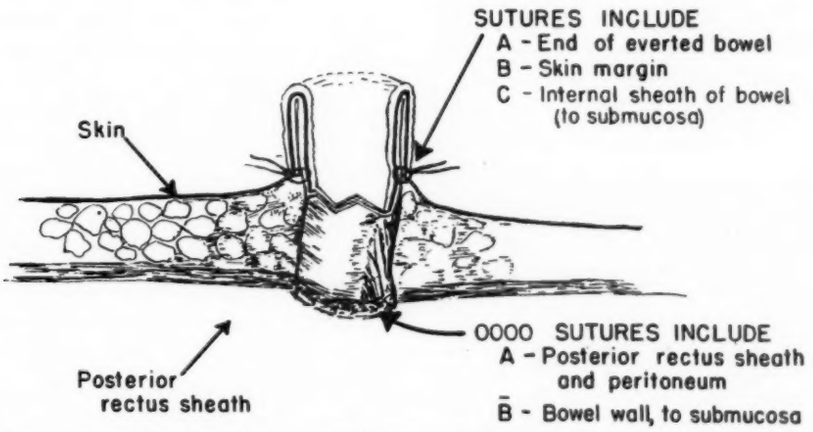

SUTURES INCLUDE
A - End of everted bowel
B - Skin margin
C - Internal sheath of bowel (to submucosa)
Skin
0000 SUTURES INCLUDE
A - Posterior rectus sheath and peritoneum
B - Bowel wall, to submucosa
Posterior rectus sheath

FIG. 1. A method for ileostomy. The muscularis of the ileum and the mesentery are sutured with No. 0000 (2½ lb. test) silk sutures to the peritoneum and posterior rectus sheath of the margin of the 2½ cm. circular incision. The skin is lifted and secured in this position to the bowel to provide slack ileum in the substance of the abdominal wall. The ileum is thereafter everted down to the skin margin and sutured there. (From *Am. J. Gastroenterol.*, in press.)

CONCLUSIONS

1. In the cases we have studied, the prognosis is immensely better in idiopathic ulcerative colitis with appropriate surgical management than with any other plan of therapy.

2. In patients with idiopathic ulcerative colitis of several years' standing, the risk of total colectomy and ileostomy is definitely smaller than the risk of death from carcinoma as a complication of colitis.

3. Transthoracic vagotomy may lead to deferral of colectomy for a variable period of time, but it appears to have a positive indication only in instances of persisting small intestinal disease of great extent in patients who have had colectomy and ileostomy.

4. Late prognosis for those patients dismissed from the hospital after ileostomy and total colectomy appears in terms of survival to be no worse than that of the general population. In terms of morbidity, it is somewhat less good, but it is immensely better than that of patients not subjected to ileostomy and colectomy.

* Obtained from Mr. H. W. Rutzen, 3451 Irving Park Road, Chicago, Ill.

5. Satisfactory surgical management of idiopathic ulcerative colitis demands a clear understanding of the factors related to a good ileostomy and meticulous attention to details.

6. There is no excuse for loss of sexual power in connection with the removal of the rectum for uncomplicated idiopathic ulcerative colitis.

REFERENCES

1. Dennis, C. and Karlson, K. E. Surgical measures as supplements to the management of idiopathic ulcerative colitis; cancer, cirrhosis, and arthritis as frequent complications. *Surgery*, 32: 892, 1952.
2. Lahey, F. H. The management of ulcerative colitis. *Postgrad. Med.*, 8: 93, 1950.
3. Counsell, P. B. and Dukes, C. E. The association of chronic ulcerative colitis and carcinoma of the rectum and colon. *Brit. J. Surg.*, 39: 485, 1952.
4. Shands, W. C., Dockerty, M. B. and Bargen, J. A. Adenocarcinoma of the large intestine associated with chronic ulcerative colitis. *Surg., Gynec. & Obst.*, 94: 302, 1952.
5. Lahey, F. H. Comment on Sauer, W. G., and Bargen, J. A. Chronic ulcerative colitis and carcinoma. *J. A. M. A.*, 141: 982, 1949.
6. Welch, C. E. and Giddings, W. P. Carcinoma of colon and rectum. *New England J. Med.*, 244: 859, 1951.
7. Dennis, C., Eddy, F. D., Frykman, H. M., McCarthy, A. M., and Westover, D. The response to vagotomy in idiopathic ulcerative colitis and regional enteritis. *Ann. Surg.*, 128: 479, 1948.
8. Eddy, F. D. Late results of vagotomy in the treatment of idiopathic ulcerative colitis and regional enteritis. *Surgery*, 29: 11, 1951.
9. Wangensteen, O. H., and Toon, R. W. Primary resection of the colon and rectum with particular reference to cancer and ulcerative colitis. *Am. J. Surg.*, 65: 384, 1948.
10. Miller, G., Ripstein, C. B. and Tabah, E. J. Surgical management of ulcerative colitis. *Surg., Gynec., & Obst.*, 88: 351, 1949.
11. Dennis, C. Ileostomy and colectomy in chronic ulcerative colitis. *Surgery*, 18: 435, 1945.
12. Kremen, A. J., Linner, J. H. and Nelson, C. H. An experimental evaluation of the nutritional importance of proximal and distal small intestine. *Ann. Surg.*, 140: 439, 1954.
13. Dragstedt, L. R., Dack, G. M. and Kirsner, J. B. Chronic ulcerative colitis: summary of evidence implicating bacterium necrophorum as etiologic agent. *Ann. Surg.*, 114: 653, 1941.
14. Crile, G., Jr. and Turnbull, R. B., Jr. The mechanism and prevention of ileostomy dysfunction. *Ann. Surg.*, 140: 459, 1954.
15. Brooke, B. N. Ulcerative Colitis and Its Surgical Treatment, p. 100. London, 1954. E. & S. Livingstone, Ltd.
16. Karlson, K. E. and Dennis, C. The elimination of postoperative morbidity in the surgical management of chronic idiopathic ulcerative colitis. *Amer. J. Gastroenterology*. (In press).

Anorectoplasty for Hemorrhoidal Surgery

ARTHUR E. LEWIS, M.D., *Seattle, Washington*

THIS paper was stimulated in part by the interest displayed in the panel discussion of complications of anorectal surgery presented at the 1954 meeting of the American Proctologic Society. During that discussion there was reference to the inclusion of raw surfaces in hemorrhoidal surgery for the purpose of drainage, and the role played by raw surfaces in relation to postoperative pain. This report is based on a five-year series of about 700 cases. The procedure employed in these cases is best described as "anorectoplasty," one purpose of which is to eliminate raw surfaces.

It has been stated that no one surgical technic so far devised assures a uniformly satisfactory operative cure in all cases of complicated hemorrhoids. Innumerable technics have been proposed for the removal and cure of internal hemorrhoids; they probably far outnumber those described for any other involved field or organ.

I wish to describe a technic for radical cure of hemorrhoids, and comment on its advantages and disadvantages. Also, the anorectal status of 100 cases subjected to the procedure will be reviewed, with reports of the condition from two months to one year after operation.

This procedure is indicated for the removal of all types of internal hemorrhoids whether or not associated with rectal prolapse, anal ulcer or chronic anorectal infection. Uncomplicated anorectal fistula in the presence of surgical hemorrhoids is not a contraindication. It is an elective procedure; however, it is contraindicated in acute prolapse with diffuse thrombosis.

Preparation of Patient. The operative site should be as free from inflammatory reaction as possible. The freedom from untoward reaction postoperatively is influenced in anorectal surgery, as in tonsil or gallbladder surgery, by the absence of infection at the time of operation.

The patient is prepared for surgery by the use of a high protein and low carbohydrate diet, elimination of chemical irritants from the proximal gastrointestinal canal and by local application of bacteriostatic agents calculated to control any infection present. The period of preparation will depend upon the amount of apparent local infection present and may require from two to six weeks. Several days before surgery a trisulfa antibiotic compound is administered orally.

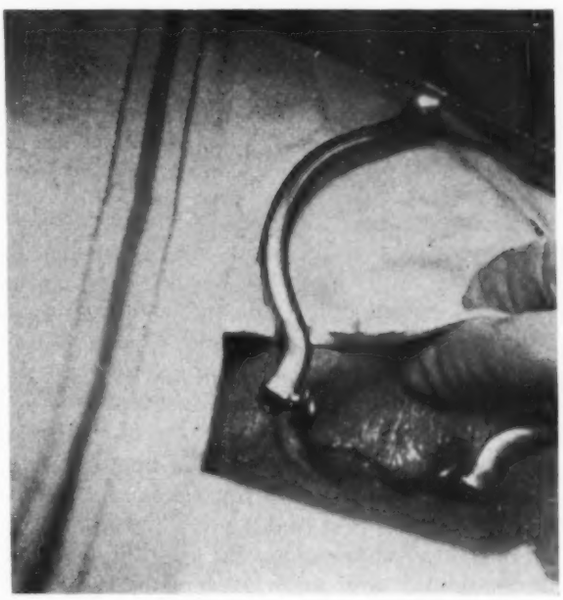
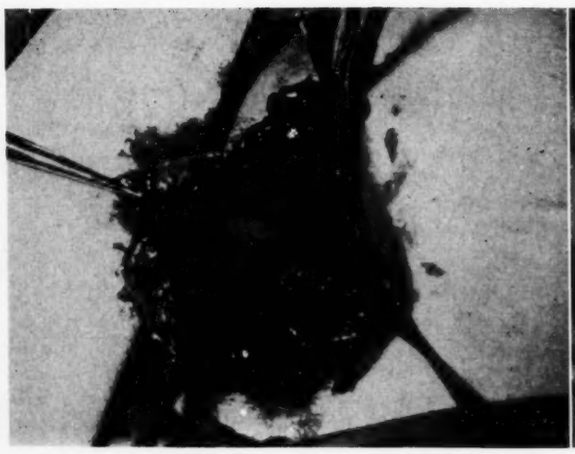


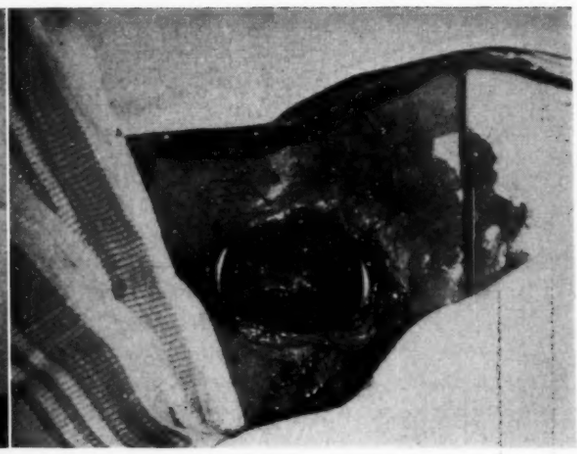
FIG. 1. Incision has been made through skin of anal canal. Retractor arms rest on anal verge.

Technic. The essential instrument is the N. D. Smith anal speculum. I cannot conceive of the procedure being performed with a substitute. Circular incision is made through the anal skin about .5 cm. distal to the bases of the anal crypts. (Fig. 1.) The anal skin and rectal mucosa are then dissected from the underlying structures (anal sphincter components and circular muscle coat of the rectum) proximally, for a distance well beyond the internal hemorrhoidal-bearing area. Metrically, this could be from 5 to 6 cm. above the anorectal line.

The diseased dissected tissue is then excised 1.5 cm. distal to the level to which it has been dissected to permit adequate mobilization of the mucosa. Bleeding vessels are tied with



2



3

FIG. 2. The cuff to be resected. Note that all hemorrhoidal tissue has been included in the dissection and that normal rectal mucosa has been elevated as a flap for transplantation.

FIG. 3. Appearance after resection of cuff.

plain No. 00 catgut. Varying amounts of fascia or connective tissue can be seen covering the internal or anal canal surface of the external sphincter muscle. This tissue contains, in part, anal gland or duct structure (Tucker) and should be stripped from the surface of the muscle.

It will be observed that the skin of the distal anal canal retracts. The external hemorrhoidal tissue is then dissected from the undersurface of this skin. (Figs. 2 and 3.)

The rectal mucosa can be approximated to the anorectal line without tension. (Fig. 4.) Usually six sutures are taken through the mucosa and skin, anchoring these to the shelving portion of the sphincter muscle (anorectal junction). (Fig. 5.) Three sutures are usually taken anteriorly, two laterally and one posteriorly. These sutures prevent prolapse or eversion of the rectal mucosa. The anastomosis is then completed with eight or ten additional sutures through skin and mucosa only, using plain No. 0 catgut. (Fig. 6.) Sulfathiazole powder is used before and after closure. Sphincterotomy may be performed if indicated.

Two cubic centimeters of efocaine (and this is optional) are injected fanwise perianally, and an oxycel® gauze strip wrapped around a thin piece of gauze is placed into the anal canal. (Fig. 7.) Compression dressing is applied. Efocaine, although its action like that of other long-lasting local anaesthetics is equivocal, has been used more than 500 times with less than 1 per cent abscesses and one case of necrosis.

The procedure of anorectoplasty is not as simple as it sounds for adequate knowledge of the local anatomy and meticulous surgery are indeed necessary.

The patient may be discharged from the hospital on the third postoperative day, the bowels having moved naturally or by means of enema that day.

Postoperative Care and Complications. As with all cases of extensive hemorrhoidal surgery, final results depend upon the adequacy of postoperative care. Before and after surgery the patient must be instructed on how to develop proper bowel habit. It is essential that a formed stool occur, starting as early as the tenth day. Also, massage of the line of anastomosis may be necessary; otherwise, disagreeable narrowing occurs here. For the apprehensive, hypersensitive patient, encouragement and more than average care is necessary. If narrowing does not occur before the twentieth day, it generally will not occur later.

While most stenotic rings correct themselves in time, a certain number of cases will require help. This is best not done until after six weeks or later. By that time it will be possible to feel a definite thin band at one or more points in the line of anastomosis. This line of scar tissue is at the level of the anorectal junction and is the most disadvantageous feature of anorectoplasty. Its relief, however, is simple and rapid if done at the right time.

The scar tissue is very simply incised in the office with a sharp, pointed scalpel. It is best performed without anesthetic because of pain created when novacaine is injected. Incision

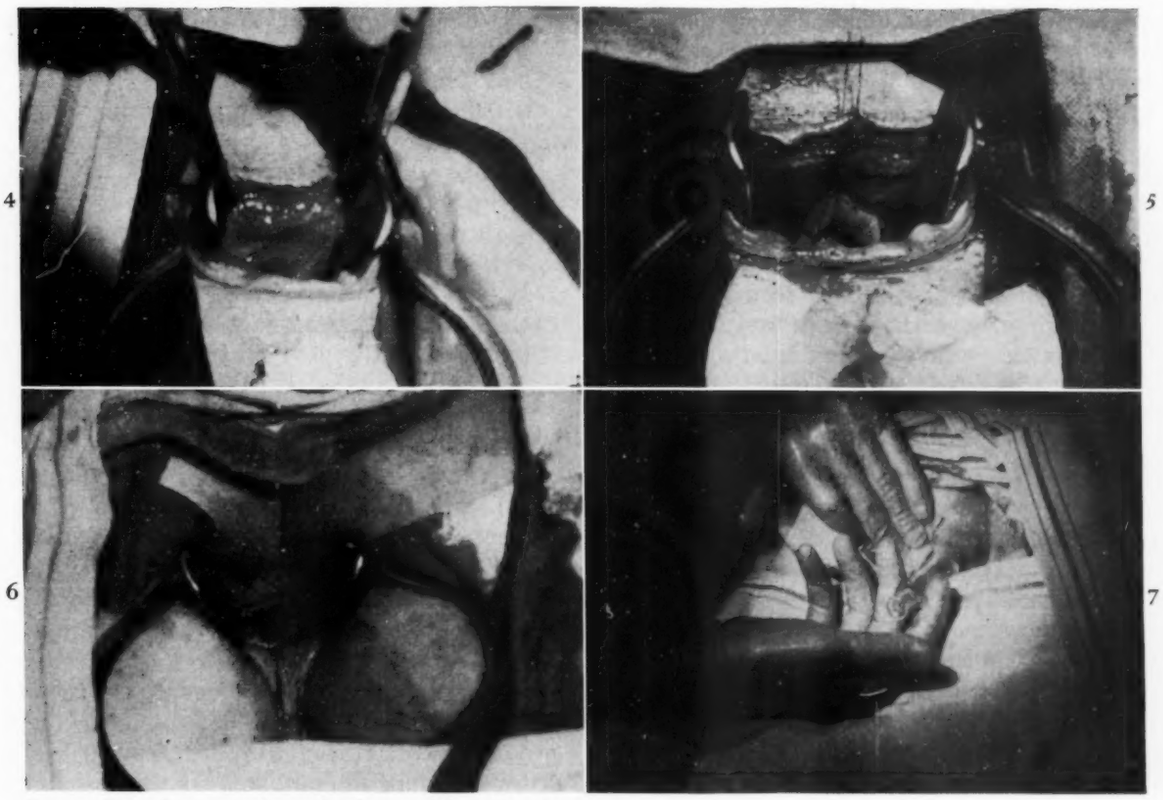


FIG. 4. Rectal mucosa brought down without tension.

FIG. 5. Suture passed through mucosa, shelving portion of anal sphincter muscle and skin before tying. The "shelf" is immediately distal to darkest area in dissection.

FIG. 6. Several (eight to ten) sutures include skin and mucosa only.

FIG. 7. Injection of efocaine; note intact anal verge skin.

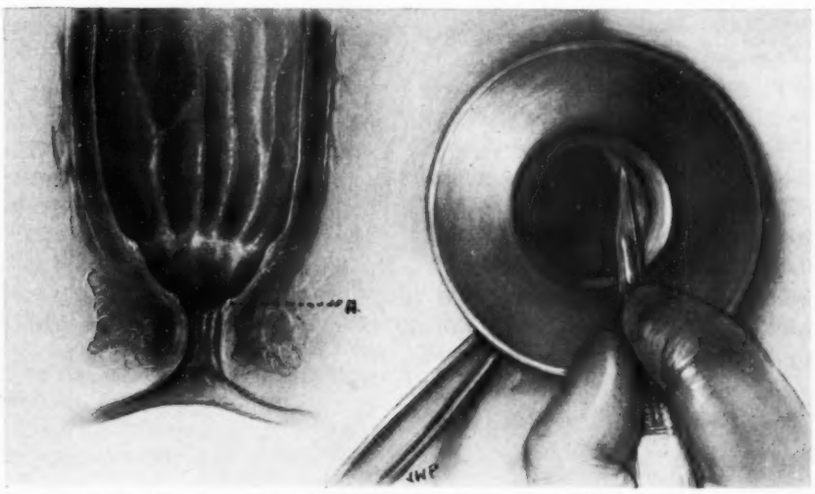


FIG. 8. Left, diagrammatic drawing of anal canal and lower rectal ampulla. Stenotic (A) ring occurs only at upper (proximal) end of anal canal, i.e., line of anastomosis. Right, white crescentic line represents stenotic area under tension (enlarged). A small cut less than 5 mm. long to a depth of 3 to 4 mm. corrects stenosis.

through the scar for a depth of 3 or 4 mm. in one or two locations will convert a stenotic canal into one that will readily admit the index finger. (Fig. 8.) In 100 unselected cases treated in 1953 to 1954, 13 per cent were incised.

Additional complications, when not preventable, are similar to those occurring in less radical procedures for the removal of hemorrhoidal tissue. One of these is temporary loss of sensation. Also, occasionally a suture will give way or tear through the skin resulting in a tag which may be removed under local anesthetic after two months.

SURVEY OF 100 CASES

A follow-up study was made of 100 patients on whom anorectoplasty was performed. The patients were closely quizzed to evaluate their ability to: (1) Control or prevent passage of flatus from the rectum; (2) control passage of liquid or semiliquid stool; and (3) ascertain the degree of normality of the first part of the defecation reflex. The following figures are presented from this survey.

Five cases had rare involuntary passage of flatus: once in five days to once in two weeks and up to three months postoperatively; one case less often (up to six months postoperatively). In two cases ability to retain or control liquid stool, when present, was difficult (one at three months and one at nine months postoperatively, the latter with a hypermotile colon). In two cases the defecation urge required immediate action to prevent soiling (each case previous to fourth month postoperatively). In two cases patients complained that they were unaware whether flatus or stool was the stimulus of defecation impulse (each before five months postoperatively).

These findings were not present a year after surgery or, if present, had no social significance. Thus, 11 per cent had defecation reflex disturbance postoperatively. The duration of symptoms varied. Most patients recovered sensation in a month or two but one had some difficulty for a year. Therefore, it is clear that this procedure produces some delay in return of all rectal sensations as compared to less radical procedures.

CONCLUSIONS

The amputative procedure is not simple or rapidly performed surgery. The following advantages may be cited:

1. Internal and external hemorrhoidal tissues are removed. There have been no recurrences in five years.
2. The anal canal is lined throughout its circumference with healthy anal skin.
3. The lower part of the rectum is lined with healthy rectal mucosa.
4. Anal glands, commonly acting as foci of infection, are usually completely removed.
5. Raw, sensitive surfaces, productive of postoperative discomfort, are eliminated.
6. Surprisingly, in spite of relatively snug closure, drainage has not been a problem.
7. The incidence of postoperative infection or abscess is less than from other procedures.
8. At the close of the operation the anal canal will admit two fingers.

Addendum: In preparing the material for this paper, it was surprising to learn the high incidence of incision of scar tissue postoperatively (13 per cent). Perhaps I had been too hasty in performing this procedure. In the last 134 cases it has been advisable to incise in only two instances. It would appear reasonable to delay six months before incising these doubtful cases, as resolution usually occurs without incision.

REFERENCES

1. Bacon, H. E. Anus, Rectum and Sigmoid Colon. Philadelphia, 1940. J. B. Lippincott Company.
2. Buie, L. A. Practical Proctology. Philadelphia, 1937. W. B. Saunders & Company.
3. Fansler, W. A. The surgical treatment of hemorrhoids. *Minnesota Med.*, 17: 254, 1934.
4. Granet, E. Manual of Proctology. Chicago, 1954. The Year Book Publishers, Inc.
5. Hirschman, L. J. Synopsis of Anorectal Diseases. St. Louis, 1942. The C. V. Mosby Company.
6. Moon, L. and Baumeister, C. A complete technique of hemorrhoidectomy. *Surg., Gynec. & Obst.*, 71: 360, 1940.
7. Rosser, C. The rational management of hemorrhoids. *Texas State J. Med.*, 34: 484, 1938.
8. Tucker, C. C. and Hellwig, C. A. Histopathology of anal crypts. *Surg., Gynec. & Obst.*, 58: 45, 1934.
9. Tucker, C. C. and Hellwig, C. A. Anal ducts. *Arch. Surg.*, 31: 521, 1935.
10. Whitehead, W. The surgical treatment of hemorrhoids, *Brit. M. J.*, 1: 148, 1882.

DISCUSSION

Leonard J. Schwade (Milwaukee, Wis.): The ideal operation for the cure of hemorrhoidal disease has been one of controversy since the early days of surgery. A review of over 100 references in the literature regarding a new technic for cure of

hemorrhoids reveals that almost everyone suggests that no method had been previously devised to do such a monumental piece of work until this particular paper was presented to the medical profession. I venture to say that in our group every member has his favorite technic for hemorrhoidal surgery and can show excellent results and cures. It is only by constant trial and error and the frequent presentation of such topics as Dr. Lewis's that we are able to arrive at a procedure acceptable to the majority.

Unfortunately too much attention is given to technic alone and not enough to the preoperative preparation and postoperative care and treatment. To achieve satisfactory results in any procedure one must first consider the basic factors of anatomy, physiology and pathology.

It is inconceivable that anyone would attempt any type of hemorrhoidectomy without first having a complete and thorough understanding of the anatomy of the anus, rectum and perianal region. Whether or not surgery is needed should be decided by the recognition of pathologic disorder. The physiology of the function of defecation in all its phases must be thoroughly understood. We can thus arrive at a suitable technic and assure the return of normal physiologic function regardless of the type of technic used.

Dr. Lewis describes an excellent method for radical anorectoplasty in anorectal surgery, which in his hands gives satisfactory results as his figures bear out. He honestly and openly presents percentage figures of the most frequent complications encountered. Narrowing in 13 per cent, although high, is corrected by incision of scar tissue. This figure will undoubtedly decrease as he improves or modifies his technic. Temporary loss of sensation during the act of defecation is indeed a serious one and must be investigated more thoroughly. He also mentions skin tags forming in some cases.

I must emphasize that I believe there is no one operation that can be adapted as a cure-all for all anorectal surgery. One must be flexible both in mind and in ability to modify his own technic to fit the case in question. I personally use the so-called double ligature method with dissection of the hemorrhoids and redundant mucosa in the accepted major quadrants, and I believe my results are quite satisfactory. I, too, find occasional complications occurring, such as postoperative fissure, stitch infection and postoperative narrowing of the canal. With the proper explanation to the patient these complications can be corrected easily without any unnecessary expended effort and with a final good result.

I believe it is important to prepare a patient mentally as well as medically for the operation. I do not hesitate to inform my patients that a hemorrhoidal operation will cause discomfort. However, I also assure them that with cooperation on their part, a proper diet and after care such as Sitz baths, sedation and the like we can alleviate pain and make their postoperative status as uncomplicated as possible.

It is also important to realize that in a young person (under the age of thirty-five), because of the anatomic make-up of his venous supply, the possibility of recurrence of hemorrhoids, regardless of the type of technic used, is a greater possibility than in older persons even if properly treated.

I am in favor of Dr. Lewis's presentation. In closing, may I state that whatever procedure is used for hemorrhoidectomy it will be satisfactory if we continue to be fair with ourselves and our patients in judging postoperative results.

Edward D. Parkinson (Boise, Ida.): I am glad Dr. Lewis presented this paper. It is somewhat similar to the one I gave last year. Obviously we have learned to perform a Whitehead operation without shortening the anal canal. For a long time this was the principal objection to this procedure.

A perusal of the history of anal operations will reveal that the English early recognized that the Whitehead operation was the one which universally removed all hemorrhoidal tissue. Even as Whitehead originally performed his operation he did not completely remove all external hemorrhoidal tissue, as Dr. Lewis does in his procedure.

This also supports the idea that we can perform plastic operations on the anal canal without much danger of infection. Dr. Lewis' large list of cases substantiates that idea. However, I do believe there is possibly some advantage in leaving open wounds either bilaterally or posteriorly. The final accomplishment of the operation is the same.

Robert V. Terrell (Richmond, Va.): This paper has been most interesting and stimulating. I believe that we are all looking for the ideal hemorrhoid operation; however, I do not know what it is. We will continue to look for it in the future.

I do believe that the circular excision of tissue has in it inherent danger of complications and untoward results that can be largely avoided by the elliptic radial excision of hemorrhoidal tissues. I also think that the incidence of constriction is too high and that hemorrhoidectomy, if it is properly performed, should not be followed by a recurrence of hemorrhoids.

Emil Granet (New York, N. Y.): This brings back the old adage that there is practically nothing new in medicine, as Dr. Parkinson said. This is Whitehead's second operation brought back to life with a modification.

It might be interesting to some that the original Whitehead operation, described in 1882, did not completely remove all the mucosa circularly but retained longitudinal mucosal bridges to guard

against stricture, as Fansler and Anderson advocated in their operation described, I believe, in 1933. In a second paper published in 1887 Whitehead discarded the preferential use of mucosal bridges and routinely excised the entire cuff of pile-bearing anorectum *en masse*.

I believe Dr. Lewis intends to use this operation in complicated cases. When there are three primary hemorrhoids and no complications the simple ligature type of operation is satisfactory. I perform the ligature type in uncomplicated hemorrhoids.

I want to compliment Dr. Lewis on a step in the right direction, namely, toward the elimination of the problem of late complications following hemorrhoidectomy.

JACOB F. WENZEL (Detroit, Mich.): Since Dr. Granet closed his remarks by saying that this procedure is an advance in hemorrhoidectomy, I believe I must offer some rebuttal for fear that we will go along solidly behind this procedure.

Good surgery of the anorectal region has as one of its criteria the removal of all pathologic tissue and the retention of all normal tissue.

There are two hemorrhoidal plexuses, circular in nature and lying at different horizontal levels. One plexus lies above the anal canal; the other lies below. The communication between the two occurs longitudinally in three or four areas.

Inasmuch as the anal canal is free of a circular plexus and inasmuch as we are removing only pathologic tissue, we need not remove the anal canal. There is no reason why the patient's pathologic disorder cannot determine where the excisions are to be made, so that the normal tissue can be retained. If the areas of retention contain redundant tissue, then transverse excisions can be applied to the remaining strips.

I also thought that we had gone past the use of oil anesthetics to control postoperative pain. I am sure that good operative technic will allow a good postoperative course without the use of oil anesthesia.

Also, it is not possible to perform circular excision with anastomosis in one level in any part of the large bowel or rectum without having a high percentage of strictures.

"Without Fear and Without Reproach"*

LOUIS A. BUIE, M.D., *Rochester, Minnesota*

From the Section of Proctology, Mayo Clinic and Mayo Foundation, Rochester, Minn. The Mayo Foundation is a part of the Graduate School of the University of Minnesota.

IN that brief age of empire-building between the discovery of the New World and the establishment of New Spain in the western hemisphere, there lived in France a man called the Chevalier Bayard. Since that time he has become a national hero to his people. He is venerated by the French as "a gentleman of high courage and honor" and as a man "without fear and without reproach." Even our own placid Quaker poet, John Greenleaf Whittier, a man seldom given to extravagant displays, was moved to exclaim, some four hundred years later:

O for a knight like Bayard,
Without reproach or fear.

To live a life that is without fear and without reproach seems so impossible to us in the twentieth century, surrounded by massive fears of every nature in an atmosphere of incessant reproach and recrimination, that we may doubt that it was possible to live that way at any time. Possibly the virtues of the Chevalier Bayard, like those of our own Washington, have been overornamented during the passing of the centuries. If so, no great harm has been done, because we venerate virtues primarily, and then render honor to those who reflected such virtues or are said to have reflected them.

We can say that Joseph MacDowell Mathews was cast in the great tradition of the Chevalier Bayard. We know he was pre-eminently a gentleman, and there must be scarcely a single member of this Society who is not aware of his impervious honor and his high courage. These qualities, in fact, must have been present in his very chromosomes, for his great-grandfather fought with Mad Anthony Wayne and won uncommon distinction in the Battle of King's Mountain. Another forebear was the celebrated Ephraim MacDowell, a medical pioneer who certainly embodied the chief adornments of the character of the Chevalier Bayard. The father of Joseph Mathews was a judge, a fact which finally shapes up the endowments of our subject to give him the high mettle of the military, the integrity of the surgeon and the learning of the practitioner of law.

We know that he was many times called upon to exercise such qualities, because he was, at least in this country, the founder of a new specialty, and any innovator in any age is exposed to more than the usual share of the buffets of adversity and the maledictions of the unbelievers. We find, for instance, that when Joseph Mathews could not obtain first rate postgraduate training in proctology in this country, he refused to be satisfied with less and went to London to find what his homeland could not give him.

Next, when he decided to leave a flourishing general practice and enter into a specialty that was commonly estimated to be the murky province of charlatans and bummers, he had no illusions as to the slings and arrows that would be directed his way.

"Forty years have elapsed since I embarked in Proctology as a specialist," he wrote in 1920. "At that time no one, *anywhere*, had done so. I must confess that it was with some fear and trepidation, that I gave up general practice to enter this new and untried field. It was not recognized by any medical college or organization; not a single article relating to these important diseases could be found in any medical journal. The field was covered, and in the hands of the charlatan."

What Mathews found must have given him furiously to think, as the happily sardonic French like to say. One gentleman who set himself up as a proctologist in those days wrote a whole text on what he called "Orificial Surgery," and in the enlightened atmosphere of our contemporary Society a single quotation from this Victorian textbook may impart a slight touch of gaiety to the decorous occasion.

"If the blood current is strong and free,"

* The Joseph Mathews Oration.

wrote this erudite schleppermann of proctology, "health is assured; if, on the other hand, the general circulation is sluggish or local congestions occur, morbid processes especially of the sympathetic nervous system are of necessity initiated. 'Orificial Surgery' is based on the theory that irritation of an organ begins at its mouth and these chronic pathologic conditions including insanity and neurosthenia [*sic*] may develop from local congestion and nerve-waste."

What this means I shall leave to your own ingenuity. It may have the tones of sounding brass and tinkling cymbals, but otherwise it signifies nothing to me. I am sure it signified nothing to Joseph Mathews, for he set out to correct such rubbish after his return from London and the establishment of a specialized practice in proctology. His writings were distinguished by intelligence, honesty and common sense. He was in much demand as a speaker at various societies because he was an able orator with a great personal charm, eloquence and amiability. He was also aggressive, but not objectionably so. Unusual testimony to the esteem in which he was held by his contemporaries appears in the fact that in 1899 he was president of both the American Medical Association and the American Proctologic Society.

No doubt, as the Chevalier Bayard must have had, Joseph Mathews had faults, but in each case the faults were those produced by the ages in which the two men lived. Both rose far above them, and in doing so, left us a legacy which the strife and turmoil of our own times have not yet managed to overcome: the imperative which implants integrity and consideration for others in the conduct of modern man.

Actually, the safest and most impregnable ground on which social advancement can be founded is the universality of the affections. It is the bond of our common humanity; it is the golden link which joins together and preserves the human species. It is in the acts prompted by those affections that the existence of the highest instincts of our nature is revealed. Affection can warm the coldest temperament and soften the hardest heart. Regardless of how greatly the character of an individual may be deteriorated and debased, this spirit is capable of redeeming it.

In fact, there are few fields of human endeavor wherein attention given to the feelings of others can be neglected. This applies even in the realm of politics, wherein many of us have much to learn. Some of us have held aloof from community, state and national life. We have looked with lack of esteem on many whose activities have been confined to political realms. Now it is necessary, however, that we alter our opinion concerning these matters.

I agree with that philosophy which holds that mankind is more virtuous than vicious and that good acts are of more frequent occurrence than bad acts. We know that cruelty is counteracted by benevolence. We know that sympathy is excited by suffering. We know that the injustice of some provokes the charity of others and we know that new evils can be and often are met by new remedies.

Accordingly, outstanding qualities of estimable men are these: gentleness and courage, tolerance and reverence, humility, wisdom, patience and honesty. I believe not only that possession of these qualities engenders good manners but that the exercise of good manners furnishes proper soil for the cultivation of these qualities. The two influences working together, not alone, I believe would do much to allay many of the dreads of the world today.

Finally, may I say that you have given me extraordinary pleasure in admitting me to your company. I am profoundly and humbly grateful to you for the honor you have conferred upon me. Also I am grateful to you for being so attentive to my remarks. I wanted to remind you that certain estimable qualities commonplace among members of the medical profession and traditional in this great Society by no means occur as a matter of course everywhere in the world today. Yet they, most assuredly, bear great significance in shaping the destiny of present and future generations. I felt assured, moreover, that my remarks would fall on sympathetic ears, for although your outward lives are those of men of the world, your duties often resemble those of the minister or the priest. Like Joseph Mathews, you recognize that your lives are dedicated first of all to the service of others. Your influence will equalize the struggle between scientific man and moral man. You will seek and you will find those spiritual values which nourish and glorify the soul of man. You will strive to create a world conscience and thereby advance human dignity everywhere over the earth.

The Significance of Epilation As an Adjunct in the Treatment of Pilonidal Sinus Disease

NEIL W. SWINTON, M.D. AND ROBERT E. WISE, M.D. (*By Invitation*), *Boston, Massachusetts*

From the Departments of Surgery and Radiology, The Lahey Clinic, Boston, Massachusetts.

Two years ago at the annual meeting of this Society one of the authors (N. W. S.) presented a report on the present status of the treatment of pilonidal sinus disease.[9] This report was based on a series of 25,320 cases collected from data in questionnaires received from 51 per cent of the members of this organization. In addition, a small series of cases treated at the Lahey Clinic were discussed in more detail.

There could be no question after a study of these questionnaires that the majority of us were not entirely satisfied with the present methods of treatment of this condition. Many valuable and thought-provoking suggestions and comments were included in the questionnaires which could not be incorporated in our report at that time. One observation made repeatedly was the frequency with which hair was found in those wounds in which healing was delayed, or in those considered as recurrences. This corresponded to our own experience.

During this past year we have treated a small series of patients with an epilating dose of radiation therapy as an adjunct to our surgical procedures. This treatment was based on the concept that if these wounds could be kept free from hair, chronic excessive granulation tissue and infection, they would heal rapidly and probably remain healed. The results have been so striking and we have been so impressed with the recent publications of pathologic studies by Davage[1] and Gifford,[2] supporting many of our theories, that we feel justified in making a preliminary report on this combined therapy as an important adjunct in the treatment of pilonidal sinus disease.

The presence of hair in the majority of pilonidal sinuses has been generally recognized since Hodges first described this condition in 1880.[5] The origin of these hair shafts, however, has not been so clearly understood. Warren and Meissner,[11] in our discussions on this subject, have informed us that they have never seen an actual hair follicle in the wall of a pilonidal cyst or sinus. Granet,[4] in his excellent "Manual of Proctology," specifically refers to this problem and we quote from his text: "I am convinced that the hair found in cysts and sinuses is of extraneous origin. Individual hairs from the skin surface work their way into the sinus and finally into the cyst. Eventually through years of accumulation and by constant molding from external mechanical pressure they become compressed and kneaded into so-called hair nests."

We urge all of you interested in the origin of sacrococcygeal pilonidal sinuses to review the articles by Davage and Gifford.[1,2] Davage has made a careful pathologic study of 463 cases of pilonidal sinus disease and correlated the findings very ingeniously with our present clinical knowledge and experiences. She carefully reviewed our former, generally accepted theories as to etiology and does not believe that they can be accepted at this time in view of our present knowledge. She stated in her conclusions that the pathologic picture of pilonidal sinus disease is that of an acute or chronic inflammatory dermal sinus which contains dead hairs in about three-fourths of the cases, and that hair follicles are never found in the walls of these sinuses. She further stated that a review of the literature and a correlation of the objective information with the various theories of pathogenesis have led her to reject the commonly accepted developmental or congenital theory and to favor the opinion that sacrococcygeal pilonidal sinuses and abscesses are acquired. The recognition of similar piloni-

dal sinuses of the interdigital webs as an occupational disease of barbers is strong evidence for a similar mode of origin for the more common sacrococcygeal lesions.

Several articles have been published in the literature on the use of epilatory agents as an adjunct to the surgical treatment of pilonidal sinus disease. Goldman has called attention to this subject and has reported a small series of cases with results and technics very similar to our own.[3] Sher,[7] Turell[10] and Smith[8] have reported similar experiences. We make no claim to any originality with this report.

Our present series of cases is small. It consists of fifteen patients, ten of whom presented various complicated types of pilonidal sinus disease and five with persistently draining perineal sinuses following abdominoperineal resections for chronic ulcerative colitis.

In our discussion presented two years ago we mentioned that when possible an excision of the disease process followed by primary closure of the wound was preferred. The end results were satisfactory. However, a few weeks or even months after operation a number of these patients returned with a small break in the wound which at times was difficult to heal. Frequently shafts of hair projected from these wounds or were imbedded in the granulation tissue within the wound.

We also have been impressed with the large number of patients who have been referred to us who have had excisions elsewhere for pilonidal sinus disease followed by failure of these wounds to heal, in many instances for weeks and even months. These wounds invariably were filled with dense granulation tissue, usually with shafts of hair embedded in them, and were surrounded by masses of moist, infected hair. Our treatment of these wounds in the past has been to see these patients frequently, at five- to seven-day intervals, to shave the wound edges carefully, débride the wounds, curet and cauterize the granulation tissue and maintain strict local hygienic measures. Invariably these defects healed after a period of time with these procedures.

Our experiences in the past with the healing of perineal wounds following abdominoperineal resection for ulcerative colitis have frequently been discouraging. In our present series one patient had had a persistent perineal sinus for seven years. Wound healing repeatedly failed or was delayed in spite of careful shaving of the area and all other measures utilized to keep them clean, to prevent the formation of excessive granulation tissue and the entrance of foreign bodies such as hair shafts.

With the advent of the use of an epilating dose of radiation therapy in wounds of this type, however, all of these wounds have healed rapidly and to date have remained healed. We have not used radiation routinely in our cases. In view of the ideas expressed by Davage, a so-called recurrence may develop in the future in some of these cases. However, since we recognize the fact that the inclusion of hair constitutes a foreign body in these wounds and is the most important single reason for recurrence or failure to heal, the subsequent management of them will not be difficult. Davage believes that notwithstanding the experimental investigations by Patey and Scarff,[6] who first described the interdigital pilonidal sinus seen in barbers, the question may be raised whether an inflammatory sinus or a pit is necessary for the introduction of the first hair. She pointed out that pilonidal sinuses develop when skin is continually moist and has no horny layer. She believes it is entirely possible that a short, stiff hair may be forced through the macerated epidermis mechanically, to be followed by infection, inflammation and sinus and the eventual drawing in of enough hairs to constitute a small tuft. She mentioned the use of dry toilet tissue in personal cleansing after defecation as one possible method by which hairs can be forced through the epidermis, and quoted Samuel of India in support of this theory. In that country toilet tissue is rarely used and personal hygiene after defecation is by ablution rather than by the harsh mechanical measures. It seems obvious to us, based on our clinical experience and by the ideas which have been expressed in the literature, that the elimination of hair from this area for a sufficient period of time to allow complete and firm healing of these wounds is perhaps the most important single factor in the prevention of failures to heal and recurrences.

In our patients, both those with pilonidal sinus disease and those with perineal wounds following abdominoperineal resections, the wounds were first carefully débrided with or without anesthesia, as indicated, all excessive granulation tissue was removed and the sur-

1 2 3

FIG. 1. Typical draining pilonidal sinus. Tract is lined with infected granulation tissue and sinus is filled with hair shafts.

FIG. 2. Pilonidal sinus with pinpoint opening into cyst, suggesting portal of entry of hair shafts.

FIG. 3. Pilonidal sinus treated by excision, primary closure of wound and epilating dose of radiation therapy; twenty-one days after operation.

rounding area very carefully shaved. In approximately half of our patients primary closures were then performed. We believe that this is entirely justifiable because of the resultant minimal scar which ordinarily can be obtained. (Figs. 1 to 3.)

Goldman,[3] in his series of cases, gave an epilating dose of x-rays an average of four days before operation, although this time varied.

In the majority of our cases x-ray therapy was given approximately ten days after operation or about the time these patients left the hospital. The end results have been about the same regardless of which method was followed. Epilation has been effective for an average of eight to ten weeks. At the end of that time the hair formation in this region has returned approximately to normal.

In four of our patients, after the wounds had been carefully examined at seven- to ten-day intervals, an additional small dose of x-rays was given because of the development of hair. The plan of radiation therapy in all cases has been to administer a temporarily epilating dose of x-rays at a single sitting.

All treatments were given at 90 k. v. p. with a target skin distance of 17 cm. With one exception, no filtration was added. A margin of 5 to 7 mm. around the lesion was included in the treatment field and the surrounding areas were blocked off with lead.

In general, an attempt was made to deliver a dose of 350 to 450 roentgens to the margins of the lesion. The very irregular contour of the lesions and the body surfaces in this area has necessitated considerable variation in the measured dosages at the end of the cone in order to deliver the estimated dosages, mentioned previously, to the margins of the lesion. This irregularity of contour with the associated difficulty of dosage calculation accounts, we believe, for the four initial failures necessitating retreatment.

Warren, in considering this problem, has given us a word of warning which is very important because of his extensive experience with radiation injuries. Radiation therapy to this region must be administered carefully and in as small doses as possible to produce the desired effect. The area must be carefully shielded. Certainly, it is apparent that irradiation dermatitis in this area would be a most distressing sequela to this combined method of treatment. He also suggested (and this should be seriously considered by all of us for certainly we plan to study this further in the future), that there may be other agents, such as some of the sulfide preparations or some of the cosmetic preparations so well known to women and so little known to us, that may produce adequate epilation in this area without the potential danger of the indiscriminate use of radiation therapy.

It must also be recognized that small doses of radiation delivered to these wounds may

have a definite stimulatory healing effect in addition to the epilation produced. The elimination of hair from these wounds is the most important factor but the improved circulation of this region, resulting from the radiation, undoubtedly is an additional factor in the lessened healing time and the prevention of recurrences.

SUMMARY AND CONCLUSIONS

Recent evidence reported in the literature gives support to the theory that probably the majority, if not all, of pilonidal sinuses have an acquired rather than a congenital origin.

The hair shafts found in these cysts and sinuses have been shown to arise from the skin surfaces and not from the walls of the sinuses.

The clinical significance of hair shafts found in pilonidal cysts and sinuses acting as a foreign body, with resulting delayed healing, is obvious.

The epilation of the wound edges by radiation therapy has been shown to aid materially in the healing and in the prevention of recurrence of pilonidal sinus wounds.

It is suggested that other epilatory agents may be found which have less potential danger than radiation and yet give similar beneficial effects.

REFERENCES

1. Davage, O. N. The origin of sacrococcygeal pilonidal sinuses based on an analysis of four hundred sixty-three cases. *Am. J. Path.*, 30: 1191–1204, 1954.
2. Gifford, H. The role of hair in the pathogenesis of postanal pilonidal sinus. *Stanford M. Bull.*, 12: 185–189, 1954.
3. Goldman, B. Combined therapy for pilonidal (sacrococcygeal) cyst and sinus; roentgen epilation of operative field prior to surgical excision with primary closure. *J. Internat. Coll. Surgeons*, 18: 903–909, 1952.
4. Granet, E. Manual of Proctology; pp. 298–317. Chicago, 1954. Year Book Publishers, Inc.
5. Hodges, R. M. Pilonidal sinus. *Boston M. & S. J.*, 103: 485–486, 493, 544, 1880.
6. Patey, D. H. and Scarff, R. W. Pilonidal sinus in a barber's hand with observations on postanal pilonidal sinus. *Lancet*, 2: 13–14, 1948.
7. Sher, J. J. X-ray treatment of pilonidal cysts. *U. S. Nav. M. Bull.*, 42: 391–392, 1944.
8. Smith, R. M. Roentgen irradiation as an adjunct to surgical treatment of pilonidal cyst. *Am. J. Roentgenol.*, 38: 308–311, 1937.
9. Swinton, N. W. and Markee, R. K. Present status of the treatment of pilonidal sinus disease. *Am. J. Surg.*, 86: 562–571, 1953; *Tr. Am. Proct. Soc.*, pp. 562–569, 1953.
10. Turell, R. Radiation therapy for recurrent sacrococcygeal cysts and sinuses. *Surgery*, 8: 469–472, 1940.
11. Warren, S. and Meissner, W. A. Personal communication.

DISCUSSION

A. J. Caliendo (Brooklyn, N. Y.): Every surgeon treating sacrococcygeal wounds following excision of pilonidal cysts and sinuses has at some time encountered difficulty in the healing process. The same applies to perineal wounds following combined abdominoperineal resections and other operative procedures when the rectum is removed. There is no doubt that hairy individuals present more of a problem in this respect than non-hairy ones. The presence of hair in and around any wound is a surgical nuisance and can give rise to delayed wound healing. This difficulty is encountered more often in the open type of operation in pilonidal disease than when primary suturing of the wound is performed. Most of us handle this problem by shaving the hair around these wounds at frequent intervals. Like Dr. Swinton, I have never had any personal experience in the use of epilatory creams and the like. Several colleagues who have tried these preparations object to their use because of the danger of tissue sensitivity with dermatitis. Also, in the plucking type of epilatory there is the possibility of folliculitis with infection.

The authors have adequately presented the important points brought out by Davage of the University of Michigan where the past theories of the congenital and developmental origin of pilonidal disease have been upset and the acquired theory favored, as illustrated by the pilonidal sinus occurring in the barber's hand. The extrinsic origin of the nests of hair found in pilonidal cysts and sinuses has been corroborated by many pathologists. Hair follicles in the walls of these tissues have not been demonstrated. The hair apparently arises from the skin surface around the opening of a pilonidal sinus or cyst and either grows into, or is forced into, the cyst or sinus. These hairs keep growing in these confined areas, rolling up into a ball, and eventually are freed from their follicles to form the nest of hairs. As we all have observed, these hairs come out very freely when pulled and are not attached to any follicles.

The growth of hair in and around healing sacrococcygeal wounds, or around any wound in a hairy region, does predispose that wound to slower healing and infection, especially if the skin inverts around the edges of the wound and the hair follicles along with it. The hair can then grow into the granulation tissue and result in a process of subacute infection with subsequent fibrosis around the edges of the wound. With this scarred ring around the wound, healing is delayed and epithelialization

is difficult. These are the wounds that take months to a year or more to heal, unless the scarred edge is excised and the infected granulation tissue curetted out or excised. In wounds in which primary closure is effected, occasionally a small area of the wound remains unhealed with the skin edges tending to invert, creating a situation almost like another sinus. Hair growing into this type of wound defect presents a problem and most of the time the area has to be excised and healing started anew.

Epilation of skin by small doses of x-ray is warranted when the hair creates a nuisance in contributing to delayed wound healing. I do not believe that its use is justified in all cases, except when indicated in the postoperative period. I agree with Drs. Swinton and Wise that the treatment should be carefully administered, and in small doses. Radiation dermatitis in the anal and coccygeal areas, as the authors have stated, is nothing to be desired.

J. B. Christensen (Omaha, Neb.): There is general agreement that loose hair is an important factor in this disorder, for in treating these patients we are dealing with a back, the full length of which is covered by hair. These hairs gravitate down the back and as soon as they hit this moist wound, are apt to enter into it, the same as the hair in the immediate vicinity. It would appear to me that there is no substitute for very regular cleansing and careful attention to this wound, perhaps two or three times a week.

Frank H. Murray (Philadelphia, Pa.): Postoperative infection often occurs because we allow patients to use a bedpan. These patients therefore should have bathroom privileges postoperatively.

Abdominal Proctopexy and Primary Sigmoid Resection for Rectal Procidentia*

HOWARD M. FRYKMAN, M.D., *Minneapolis, Minnesota*

RECTAL procidentia, often referred to as massive rectal prolapse, has continued to be a challenge to the surgeon, with the majority of technics proposed ultimately showing too many recurrences. The immediate results obtained by most procedures have been good, but the long range results have been far from satisfactory. In this paper selected technics and modifications of technics have been combined into one operation in the hope that permanent cures in this condition may be achieved. Eight cases of massive rectal procidentia are presented in which the patients were treated with laparotomy, with elevation and fixation of the rectum, repair of the pelvic floor and segmental resection of all the excess sigmoid colon with end-to-end anastomosis.

In 1939 Pemberton and Stalker[8] concluded that an abnormally loosely attached rectum was the most important factor in the development of massive rectal prolapse and that prolapse could not develop if the organ was firmly fixed. They advocated complete posterior mobilization of the rectum, elevation and intraabdominal fixation, along with raising the level of the pelvic floor. The cavity created posterior to the rectum by the dissection and elevation fills in with scar tissue achieving firm fixation of the posterior rectal wall. Graham[3] in 1942 concurred with Moschowitz[6] that rectal procidentia was a sliding hernia and believed that repair must employ the same principles applied to all hernias. He advised laparotomy, excision of the peritoneal sac and closure of the defect in the pelvic floor by suture of the levator fascia anterior to the rectum. Bacon,[1] Dunphy,[2] Hayden[4] and others have reported success with the Block-Mikulicz exteriorizing resection of the sigmoid colon in this condition, in conjunction with other reparative procedures. The Block-Mikulicz resection accomplishes elevation and shortening of the redundant bowel, with firm fixation to the anterior abdominal wall. Extraperitoneal closure of the clostomy is done later. In 1951 Stabins[9] reported a case of rectal procidentia. The patient had been treated by laparotomy with division of the pelvic peritoneum to bring the prolapsed rectum up into the abdomen, plus primary resection and anastomosis of the excess sigmoid colon. Newell[7] recently reported a case of massive rectal prolapse in which the rectal mobilization and proctopexy were done in a manner similar to that used in this series. The abdominal phase of this operation was followed by perineorrhaphy and plication of the anal sphincter. The excess sigmoid colon, however, was not resected.

The satisfactory results reported by authors utilizing the Block-Mikulicz resection in rectal procidentia prompted the use of segmental resection of the sigmoid colon with end-to-end anastomosis. A primary anastomosis is superior to the exteriorizing procedure since it avoids a temporary fecal fistula, plus the increased morbidity and economic loss to the patient required by the secondary operation for colostomy closure. The fixation to the anterior abdominal wall provided by the Block-Mikulicz resection is unnecessary if any adequate segment of the sigmoid and sigmoid mesocolon are excised.

In reviewing the literature it was found that primary resection and anastomosis of the sigmoid colon in the treatment of massive rectal prolapse was not new. In 1902 von Eiselsberg[10] in Vienna reported two cases, with treatment by colopexy and primary resection of the sigmoid colon. In both cases colopexy alone had been planned as definitive treatment, but primary resections and anastomoses were performed because the sigmoid colons were unusually long and it was feared that volvulus might occur. One patient died postoperatively

* A portion of this paper was presented as a preliminary report at the meeting of the Minneapolis Academy of Medicine on March 21, 1955.

from a complication unrelated to the surgery and the other patient was cured. Von Eiselsberg believed that in the future, primary resections of the sigmoid colon would not be as hazardous and would be used more frequently in the treatment of massive rectal prolapse.

a long mesentery must be present in order to reach to the bottom of the deep pelvic floor. If all of these abnormalities or weaknesses are present, numerous exciting causes may initiate the prolapse. An adequate surgical procedure designed to cure rectal procidentia should cor-

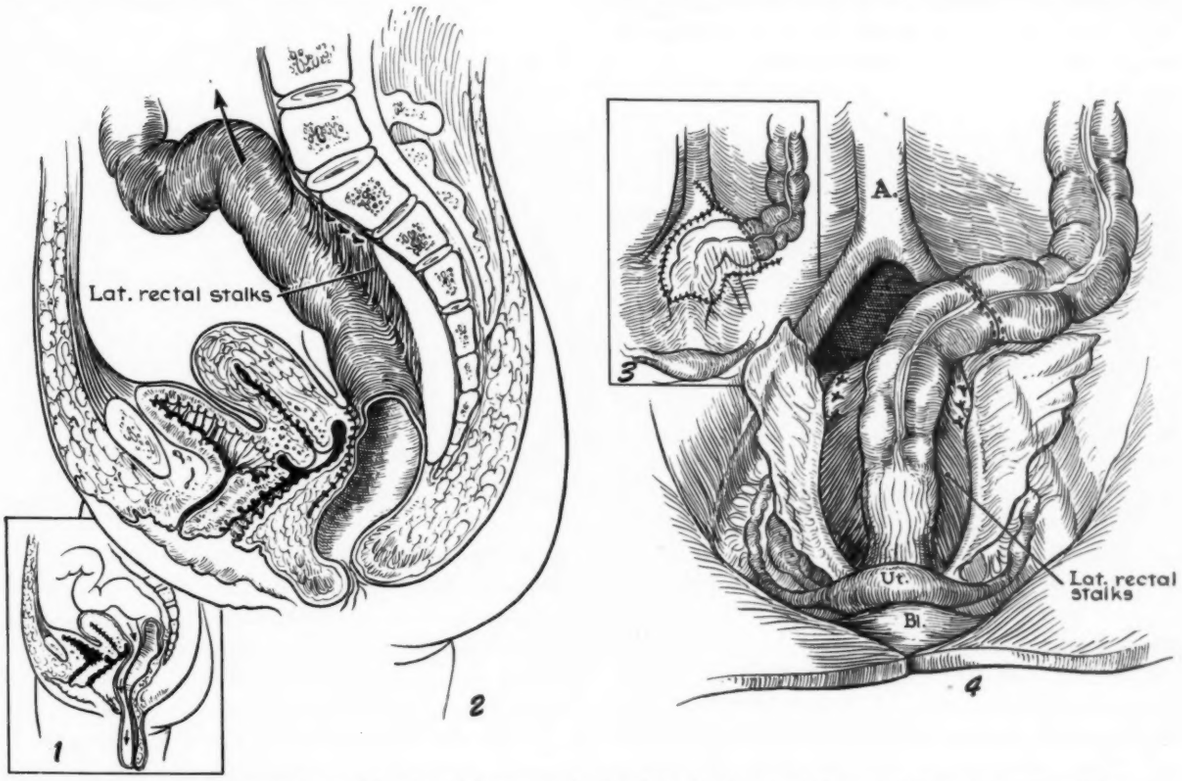


FIG. 1. Illustration of rectal procidentia with arrows indicating the deep cul-de-sac of Douglas or hernial sac.

FIG. 2. Illustration of rectum mobilized and elevated to its maximum extent, with suture of the lateral rectal stalks to the periosteum of the sacrum. The cavity created posterior to the rectum fills in with scar tissue to achieve firm fixation of the posterior rectal wall. The suture line anterior to the rectum indicates the site of suture of the endopelvic fascia and obliteration of the cul-de-sac. The excess peritoneum is excised.

FIG. 3. Illustration of anterior view of the mobilized and elevated rectum showing the lateral rectal stalks sutured to the periosteum of the upper portion of the sacrum. The anastomotic suture line is shown following the colon resection with maximal shortening of the sigmoid.

FIG. 4. Illustration of the reconstructed pelvic floor. After excision of the excess peritoneum the new peritoneal floor is snugly sutured about the bowel with interrupted silk sutures.

It is generally accepted that rectal procidentia is a sliding hernia through the pelvic fascia as described by Moschowitz.[6] However, in order for the rectum to prolapse through the defect in the pelvic floor and protrude through the anal sphincter, three additional abnormalities are essential: (1) an abnormally deep cul-de-sac of Douglas, or rectovesical pouch must be present (Fig. 1.); (2) the rectum must be abnormally loosely suspended in the pelvis with weak and elongated suspensory ligaments; and (3) a mobile redundant sigmoid colon with

rect all three of these abnormal findings, along with closure of the defect in the pelvic floor. This must be done through the abdominal approach since it is impossible to fulfil these requirements through perineal procedures alone.

No claim to originality is made for the operation to be described in this paper. It is but a composite surgical procedure using selected technics or modifications of technics which have been advocated by others, and is designed to eliminate all of the abnormal factors that contributed to the formation of rectal proci-

dentia. It consists of the following steps: (1) mobilization of the rectum by the abdominal route; (2) elevation of the rectum as high as possible and fixation of the lateral rectal stalks by suture to the periosteum of the sacrum; (3) suture of the endopelvic fascia anterior to the rectum and obliteration of the cul-de-sac; (4) segmental resection of all the excess sigmoid colon with end-to-end anastomosis.

TECHNIC

The abdomen is opened through a lower midline incision and the patient is placed in a deep Trendelenburg position. Incision of the pelvic peritoneum and dissection of the rectum are done exactly as in the abdominal phase of a Miles abdominal-perineal resection, except for preservation of the blood supply to the rectum and keeping the lateral rectal stalks intact. The pelvic peritoneum is incised close to the bowel wall on either side of the colon, with the incisions extending downward to unite in the rectovesical or rectouterine sulcus. The rectum is mobilized by blunt dissection, posteriorly down to the coccyx and anteriorly to below the prostate or low on the posterior vaginal wall. This dissection can be accomplished with ease because of the laxity of the rectal supports. The freed rectum is drawn up into the abdomen making the lateral rectal stalks stand out prominently. The rectal stalks are then sutured to the periosteum of the sacrum to hold the organ firmly in this elevated position. (Figs. 2 and 3.) This is done by placing mattress sutures of silk through each rectal stalk and into the periosteum of the upper portion of the sacrum in a linear manner. The sutures are not tied until all have been placed, and it has been determined that the rectum has been elevated to its maximum extent. The cavity created posterior to the rectum by the dissection and elevation fills in with scar tissue, after the method of Pemberton,[8] achieving firm fixation of the posterior rectal wall. The cul-de-sac is obliterated to a high level by suturing the endopelvic fascia anterior to the rectum, excising the excess peritoneum and snugly suturing the new peritoneal floor about the elevated bowel with interrupted silk. (Figs. 2 and 4.) The lateral stalks of the elevated rectum are sutured to the periosteum of the sacrum rather than suturing the stalks together anterior to the rectum as advised by Hayes and Burr[5] and by Bacon,[1] for two reasons: (1) to provide firm fixation of the rectum until fibrosis can occur in posterior space and (2) to prevent tension on the anastomotic suture line during the early postoperative period which might occur with straining. The sigmoid colon is then prepared for resection by division of the mesocolon and its vessels down to the superior hemorrhoidal artery and vein which are preserved. Sufficient sigmoid colon and mesentery are resected so that the anastomosis may be accomplished without tension but completely eliminating the redundancy. Any convenient site may be selected for the anastomosis. An open anastomosis is used with an initial layer of No. 00000 chromic catgut and a second layer of interrupted fine silk sutures. All of the incised peritoneal surfaces are approximated with interrupted fine silk sutures.

TABLE I
RECTAL PROCIDENTIA

Case	Age* and Sex	(Sigmoid Resected†) (cm.)	Follow up (mo.)
I	37, F	28	7
II	60, M	36	30
III	27, F	23	21
IV	54, F	26	15
V	48, F	25	10
VI	59, F	38	8
VII	33, F	68	6
VIII	36, F	32	6

* Average age, 44.5 years.
† Average length of sigmoid resected, 34.5 cm.

RESULTS

Seven women and one man with rectal procidentia are included in this series. The ages of these patients ranged from twenty-seven to sixty years, with an average of forty-four and a half years. (Table I.) Two of these patients had had previous attempts at surgical repair done elsewhere, with recurrences. Case I had a perineal amputation of the prolapsed rectum plus a modified Moschowitz procedure with recurrence of the procidentia eleven months later. Case IV had a laparotomy performed fourteen years before at which time the colon was "tacked up." A recurrence developed eight years later following a weight loss of 40 pounds.

All of the patients were treated by proctopexy and segmental resection of the sigmoid colon as described, leaving only enough sigmoid so that end-to-end anastomosis could be accomplished without tension. The average length of the resected segment, as measured by the pathologist, was 34.5 cm., with a maximum of 68 cm. and minimum of 23 cm. (Table 1.) The average period of postoperative hospitalization was 11.3 days, which is not appreciably different from that found with any colonic resection. Most of the patients had been hospitalized for two or three days prior to surgery for preoperative preparation, although some had been hospitalized longer for study and care. There was no operative mortality in this series and only one postoperative complication. Thrombophlebitis with a non-fatal pulmonary embolus developed in Case v. This was effectively treated with heparin and dicumarol.

These patients have been followed for a period of from six to thirty months, with no evidence of recurrence. It was expected that some of the patients might have symptoms postoperatively due to redundant rectal mucosa prolapsing through the anal canal, even though the muscular wall of the rectum was firmly fixed. To date, however, no eversion of the rectal mucosa has been found and no additional therapy has been necessary.

All of the patients have regained adequate sphincter control through the use of sphincter exercises, with one exception. Case IV was definitely more incontinent immediately following the surgical procedure than she had been preoperatively. Considerable improvement has been noted but her control is still inadequate and plication of the sphincter is contemplated. The younger patients rapidly regained muscle tone in the dilated sphincter and are continent of both gas and liquid stool. The others are able to control liquid stool but have difficulty holding flatus.

Prior to surgery all of the patients in this series had partial obstructive symptoms to some degree, secondary to the rectal procidentia. In addition to the prolapsing rectum most of the patients complained of constipation, crampy abdominal pain, bloating, inability to pass gas, a full feeling in the rectum, bleeding and passage of mucus. Some or all of these symptoms as a rule had been present for years prior to the actual eversion of the rectum. Some patients had apparently been treated as having functional bowel problems before the rectal procidentia became evident to explain the origin of the symptoms. Following the repair of the procidentia and resection of the excess sigmoid colon, the partial obstructive symptoms disappeared completely and normal bowel habits were established.

CASE REPORTS

CASE I. R. J., a thirty-seven year old white woman, had had a massive rectal prolapse for eight years, beginning shortly after the birth of her first child. Initially the rectum had prolapsed only with bowel movements, but the mass gradually became larger and began to descend when the patient walked or lifted. In May, 1951, a circular amputation of the prolapsed rectum plus a modified Moschowitz procedure had been performed elsewhere. Recurrence of the rectal prolapse occurred eleven months later. The patient was incontinent of gas and soft stool.

She was thin, weighing 110 pounds, and poorly developed. The anus was relaxed with very little contractile power present in the sphincter. The recurrence of the rectal prolapse measured about 4 cm. in length and was about 6 cm. in diameter. A moderately severe diabetes mellitus had been present for about fifteen years.

On July 22, 1952, the operation as described was performed, with primary resection of 28 cm. of sigmoid colon. The patient was discharged from the hospital on the nineteenth day, her postoperative stay being prolonged because of difficulty in controlling diabetes. Her local doctor reported that her anal control had been very poor initially, but that it rapidly improved with sphincter exercises. The patient died unexpectedly from a complication of diabetes about seven months following surgery. No recurrence was noticed at the time of death.

CASE II. W. C. C., a sixty year old white man, was admitted to Minneapolis General Hospital (No. 37194) on December 5, 1952. He gave a history of intermittent rectal prolapse for the past twelve years, with a gradual increase in the size of the mass. Prolapse occurred only with straining at stool and could be easily reduced by digital manipulation. On the day prior to admission the rectum had prolapsed and the patient had been unable to replace it.

Considerable bleeding had occurred. His control had been fairly good, except for gas and liquid stool.

On examination a large rectal procidentia was found, with the protruding mass measuring about 10 by 15 cm. The mucous membrane was very cyanotic and edematous with many superficial erosions present. The prolapse was reduced. Barium enema was negative except for a long redundant sigmoid colon. The patient's general physical condition was good.

The operation as described was performed on December 17, 1952. The sigmoid colon was long and redundant and 36 cm. of the excess bowel was resected. Postoperative convalescence was uneventful and the patient was discharged from the hospital on the twelfth postoperative day.

Follow-up has shown the patient to be completely symptom-free. Bowel movements are normal and regular once daily, and he is completely continent of everything except flatus. Rectum appears normal and well fixed, with no evidence of recurrence two and a half years later.

Case III. H. S., a twenty-seven year old white woman, had a history of rectal prolapse for the past three years. She was told that as a baby she had had a rectal prolapse which had been "treated" and disappeared. Constipation, abdominal distention, "gas-pains" and passage of mucus had been present for many years, but no rectal prolapse was noted until a few months after she was delivered of her first child. The rectum began to evert on straining with bowel movements and gradually became larger. The patient was unable to control gas but was not incontinent of stool.

Examination revealed that the rectum could be made to prolapse on straining at stool, with the mass measuring about 7 by 10 cm. General physical condition was excellent.

On September 15, 1953, the operation described was performed, with segmental resection of 23 cm. of excess sigmoid colon. The patients' postoperative convalescence was uneventful and she was discharged on the seventh postoperative day. Her sphincter tone returned rapidly with sphincter exercises and she soon had good control of both gas and stool.

Constipation and partial obstructive symptoms promptly disappeared and her bowel habits became normal and regular. A subsequent pregnancy occurred and the patient was delivered of a full-term infant fifteen months postoperatively. The rectum appears normal with no evidence of recurrence twenty-one months following surgery.

Case IV. M. D., a fifty-four year old white woman, developed a slight rectal prolapse about thirty-five years ago as a student nurse. She gained 30 pounds during three years of nurses' training and the prolapse completely disappeared. About fifteen years ago the rectal procidentia reappeared. In 1941 laparotomy was done to "tack-up" the colon. She had no further trouble until eight years ago when a diagnosis of diabetes mellitus was made, and she lost 40 pounds on a diet. The prolapse reappeared as she lost weight and gradually became larger until a mass about 6 inches long prolapsed with each bowel movement. Some protrusion also occurred with walking or lifting. "Injection treatments" had been tried elsewhere three years ago without success.

Examination revealed a rectal procidentia measuring about 8 by 15 cm. produced by straining at stool. The anus was relaxed, dilated and paralyzed. Barium enema showed a moderate degree of diverticulosis of the entire colon. Her general condition was good except for the diabetes mellitus which was under good control.

On March 4, 1954, the operation as described was performed, with fixation of the rectum and resection of 26 cm. of excess sigmoid colon. The patient was discharged from the hospital on the ninth day after an uneventful convalescence. For the first three months she was completely incontinent. Daily enemas in the knee-chest position, similar to colostomy irrigations, were necessary to prevent soiling. Her continence has improved with sphincter exercises but is still not satisfactory, and plication of the sphincter is contemplated to improve her control. The rectum is in normal position, with no evidence of recurrence fifteen months postoperatively.

Case V. A. F., a forty-eight year old white woman, gave a history of rectal prolapse for about the past two years. The prolapse occurred only with bowel movements and was easily replaced. Abdominal distress had been present for many years, consisting of right-sided abdominal pain and bloating which could be relieved by enemas or expelling gas. Appendectomy had been performed eight years before, with no relief. The patient had then suggested to her local doctor that cholecystectomy might

give some relief even though cholecystograms were normal. The prolapse became evident two years ago following a 35 pound weight loss, which had been recommended because of obesity and moderate hypertension. She was unable to hold flatus but her sphincter control was otherwise good.

On examination the rectum could be prolapsed while straining at stool, the mass measuring 7 cm. in diameter and about 6 cm. in length. The sphincter was dilated but the contractile power was good. Her general condition was good except for a moderate degree of obesity and hypertension.

On August 4, 1954, the operation described was performed with segmental resection of 25 cm. of sigmoid colon, as measured by the pathologist. Her postoperative course was complicated by thrombophlebitis and a nonfatal pulmonary embolus, which was effectively treated with heparin and dicumarol. She was discharged on the thirteenth postoperative day. Following corrective surgery all the abdominal pain and partial obstructive symptoms disappeared. Bowel movements became normal and regular; the patient had good control except for gas. Ten months postoperative the rectum appears normal and well fixed, with no evidence of recurrence.

Case VI. D. L. F., a fifty-nine year old white woman, gave a history of chronic constipation, crampy lower abdominal pain, bloating and inability to pass gas for many years. Enemas had been used regularly for bowel movements since laxatives increased her abdominal discomfort. A constant feeling of fullness in the rectum had been present for several years which was aggravated on standing. About three years ago "hemorrhoids had begun to protrude" and hemorrhoidectomy performed elsewhere, brought no relief. The protrusion recurred and gradually became larger until a mass about the size of an apple would protrude with straining at stool. Some bleeding had been noted and a great deal of mucus had been passed.

The patient was small and poorly developed, weighing 97 pounds. The rectum could be made to prolapse on straining, with the mass measuring about 6 by 6 cm. and involving all the layers of the bowel wall. The sphincter was dilated but the contractile power was good. Sigmoidoscopy was essentially negative to 35 cm. except for a small benign adenoma at 14 cm. which was biopsied and fulgurated. The patient's general condition was good.

On October 21, 1954, the operation described was performed. An unusually long sigmoid colon and mesentery were found and 38 cm. was resected. (Fig. 5.) Convalescence was uneventful and the patient was discharged from the hospital on the eighth postoperative day. Symptoms of partial obstruction disappeared completely and the patient now has regular bowel movements. Her control is good except for gas. The rectum appears normal with no evidence of recurrence eight months following surgery.

Case VII. L. L., a thirty-three year old white woman, had been hospitalized with mental illness for about ten years (Anoka State Hospital, No. 6207). A rectal procidentia had been present for at least eight years and had gradually grown larger until a mass about 7 or 8 inches long would protrude with each bowel movement. Some protrusion had also been noted with walking or lifting. Recently the staff had had considerable difficulty in reducing the mass and surgical consultation was sought.

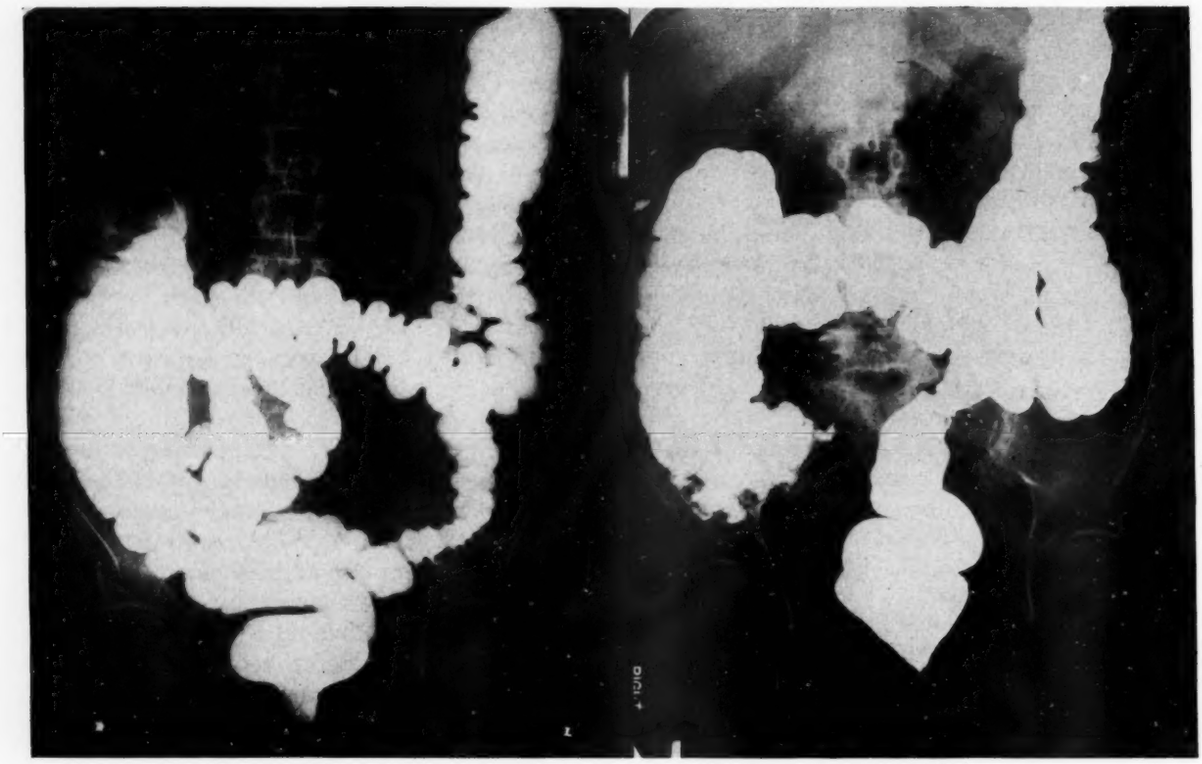
The patient was a large woman, weighing approximately 180 pounds. Examination revealed a large rectal procidentia measuring about 10 by 18 cm. The anus was relaxed and dilated. Barium enema showed the entire colon to be dilated, with an extremely long sigmoid colon. The patient's general condition was good.

On December 13, 1954, the operation as described was performed. An enormously long dilated sigmoid colon was found and 68 cm. of the excess sigmoid was resected.

The patient made an uneventful convalescence and normal bowel habits were established. Her control seems to be adequate so that she rarely soils herself. The sphincter tone is only fair, but the rectum otherwise appears normal and well fixed six months following surgery.

Case VIII. E. M. S., a thirty-six year old white woman had been hospitalized for eight years with mental illness (Anoka State Hospital, No. 6114). Rectal procidentia had been present for about ten years. The rectum prolapsed only with bowel movements and was easily reduced by the patient.

On examination the rectum could be made to prolapse on straining with the mass measuring about 9 by 12 cm. The sphincter was



5A 5B

FIG. 5. Case VI. A, barium-filled colon before surgery demonstrating the dilated, unsupported rectum and the long redundant sigmoid colon. B, barium-filled colon after proctopexy and maximal segmental resection of sigmoid colon.

dilated but the contractile power was quite good. Her general condition was excellent.

On December 21, 1954, the operation as described was performed, with primary resection of 32 cm. of sigmoid colon. Postoperative convalescence was uneventful. Follow-up has shown the sphincter tone and control to be very good. The rectum appears normal and well fixed six months following surgery.

COMMENT

With rectal procidentia, as in the treatment of carcinoma of the rectum, no one operation is suitable for use in all cases. Clinical judgment must determine the proper operative procedure to be selected for each individual patient. The surgical procedure for the treatment of rectal procidentia described in this paper is designed primarily for use in individuals whose general physical condition justifies a radical approach. With aged debilitated patients or when major surgery is contraindicated, more conservative measures may be used. Thiersch's operation, perineal amputation of the prolapsed rectum or other perineal procedures are safer for the aged poor-risk patients and may be adequate for their life expectancy. With the good-risk individuals, however, the operation which has the greatest potential for permanently curing the rectal procidentia should be recommended.

If adequate proctopexy is accomplished to eliminate the weaknesses and abnormalities in the pelvis and all of the excess sigmoid colon is resected, whether it be by the Block-Mikulicz procedure, or by primary resection and anastomosis, it is believed that recurrence of the procidentia is virtually impossible. The generally accepted concept of Moschowitz[6] that rectal procidentia is a sliding hernia demands that a long mobile sigmoid colon be present in order for the bowel to descend through the defect in the pelvic fascia. The elimination of this excess sigmoid colon and mesentery, in conjunction with the other reparative procedures, is therefore theoretically sound. The maximal shortening of the sigmoid colon will hold the rectum in its normal position, since the short remnant of sigmoid has very little mobility and cannot slide. If the redundant

sigmoid colon and mesentery are not resected, the potential remains for the development of a recurrence should stress and strain again deepen the cul-de-sac and loosen the rectal supports. The possibility of volvulus of the long mobile sigmoid colon must also be considered.

Prior to recent advances in surgery of the colon, this procedure might well have had a prohibitive mortality. This is undoubtedly the reason why colonic resections have not been attempted more frequently in the treatment of rectal procidentia. However, with general preoperative preparation of the patient, the use of antibiotics, and adequate intestinal antisepsis, primary resections of the colon can now be performed with minimal morbidity and mortality.

No operative procedure can be properly evaluated with respect to success or failure until a large group of patients have been operated upon, and follow-up studies have continued over a long period of time. Many recurrences from previous described procedures were not evident for many years. In this series too few patients have been operated upon and too short a period of time has elapsed to determine whether late recurrences or other shortcomings will be found, but at the present time it is hoped that the operation will be curative.

SUMMARY

A composite surgical procedure is presented for the treatment of rectal procidentia. Eight cases of massive rectal prolapse have been treated by laparotomy with elevation and fixation of the rectum, obliteration of the cul-de-sac and repair of the pelvic floor, plus primary resection of all the excess sigmoid colon with end-to-end anastomosis. It is believed that recurrence is virtually impossible if all of the excess sigmoid colon and mesentery are resected along with the other reparative procedures. The maximal shortening of the redundant sigmoid colon and mesentery will hold the rectum in its normal position since the short remnant of sigmoid has very little mobility. If the redundant sigmoid and mesentery are not resected, the potential remains for recurrence should stress and strain again deepen the cul-de-sac and loosen the rectal supports. The operation described is designed primarily for those patients in whom a radical approach is justifiable to give the best chance for permanent cure.

REFERENCES

1. Bacon, H. E., Burkett, W. J. and Sauer, I. Surgical management of rectal procidentia. *South. Surgeon*, 16: 1115, 1950.
2. Dunphy, J. E., Botsford, T. W. and Savlov, E. Surgical treatment of procidentia of the rectum. *Am. J. Surg.*, 86: 605, 1953.
3. Graham, R. R. The operative repair of massive rectal prolapse. *Ann. Surg.*, 115: 1007, 1942.
4. Hayden, E. P. Prolapse of the rectum. *S. Clin. North America*, 27: 1062, 1947.
5. Hayes, H. T. and Burr, H. B. Treatment of complete prolapse of rectum. *Am. J. Surg.*, 75: 858, 1948.
6. Moschowitz, A. V. The pathogenesis, anatomy and cure of prolapse of the rectum. *Surg., Gynec. & Obst.*, 15: 7–21, 1912.
7. Newell, E. T., Jr. Combined abdomino-perineal herniorraphy for massive rectal prolapse. *Ann. Surg.*, 139: 864, 1954.
8. Pemberton, J. de J. and Stalker, L. K. Surgical treatment of complete rectal prolapse. *Ann. Surg.*, 109: 799, 1939.
9. Stabins, S. J. A new surgical procedure for complete rectal prolapse in the mentally ill patient. *Surgery*, 29: 105, 1951.
10. von Eiselsberg, F. Zur operativen Behandlung grosser Rectum—Prolapse. *Arch. f. klin Chir.*, 67: 745, 1902.

DISCUSSION

E. Parker Hayden (Boston, Mass.): I have enjoyed Dr. Frykman's paper very much and am essentially in accord with his conclusions and also the points which he has brought out with regard to the factors which underlie prolapse.

My experiences with resection of the sigmoid for prolapse has not been very great, although Dr. Frykman did allude to a paper in which I included some cases from the Massachusetts General Hospital. Within that group there were only four patients who had had resection of the sigmoid.

The cases which Dr. Frykman has reported have been, I gathered, in rather good-risk patients. In my own experience I have had a good many elderly and poor-risk patients, and I would like to mention a few points by way of comparison between the two series.

Dr. Frykman's eight patients included five women and three men. In the series from the Massachusetts General Hospital there were forty-four women and sixteen men, which is approximately the same ratio. Interestingly enough, of the twenty-two patients upon whom I have operated since 1947, only two were males; the ages varied from twenty-seven to eighty-five years.

I am sure we all agree that the more procedures

we carry out on these patients, the better chance there is of cure. I would like, however, to put in a plea for the amputation procedure which I have been interested in since 1947 and have found to be quite satisfactory.

I have performed twenty-two amputations, sixteen of which comprised the only operation done on the patient, while the other six were either followed or preceded by other procedures.

Following amputation it has been necessary to reoperate upon one woman who had quite an extensive recurrence. In this case I did just what Dr. Frykman has advocated.

I had one other patient with recurrence for whom I advised an abdominal procedure which has not as yet been carried out.

I would like to illustrate several points in connection with Dr. Frykman's paper, and also from my own experience.*

The first slide illustrates typical prolapse, of which Dr. Frykman has shown a good example. This might be considered, I suppose, an average one, with a diameter of 3 or 4 inches, and a protrusion of perhaps 3 inches.

The second slide shows the longest prolapse I have ever seen, and it demonstrates a somewhat different anatomic conformation. Here the entire rectum was outside, with a narrowed sigmoid which had prolapsed to an extent which made it an extremely narrow, pointed protrusion. It illustrates, also, the fact that while in most prolapses the anterior wall is chiefly involved, here is a case of an eighty-five year old woman who had prolapsed a posterior wall for at least 6 inches. I performed an amputation operation upon this woman, establishing an end-to-end anastomosis and removing 38 cm. of sigmoid full of diverticula.

I admit that this is much more sigmoid than one ordinarily can remove in the amputation procedure. On the other hand, in this procedure, one always pulls the sigmoid down until it is taut, and the anastomosis is then performed with a short rectal stump and with the sigmoid, on very slight tension.

The third slide brings out another point. Dr. Frykman spoke of the question of volvulus of the sigmoid, and the long-resected loop illustrated here is entirely sigmoid colon. This woman did not have a prolapse but did have a volvulus of the sigmoid loop which could be drawn 6 inches outside the abdomen. I think we have all found that after we have obliterated a cul-de-sac, pulled up, and started to attach the mesosigmoid against the lateral pelvic wall, as we bring the lower segment up, we discover that we are making more and more of an omega type of sigmoid, creating an abnormal degree of angulation which I am certain should indicate a resection of the sigmoid, as Dr. Frykman has advised.

The fourth slide illustrates a rare case, prolapse of the rectum combined with extrophy of the bladder. This is the only one I have ever seen, but Dr. Wade Harris of Houston has had a similar case. His patient is getting along nicely, whereas in the other case the child was operated upon elsewhere and died following surgery.

The following are points in the amputation operation which I will describe briefly. The line of incision for the prolapse is about ½ inch outside the papillae on the mucosa. The rectum is drawn forward and the incision carried posteriorly only through the mucosa, which is a little simpler to do initially because most of the bleeding points are just under the mucosa. With the rectum thrown posteriorly, the incision is then carried around the anterior wall and the bleeding points tied. Then the incision is deepened through the entire wall of the rectum, bringing into view the peritoneal sac, as indicated.

When the sac is opened, one sees the peritonized sigmoid with the very deep cul-de-sac. This is of course the point at which the sigmoid is pulled down. I have found that I cannot pull it down very far in most cases, which means that the attachments of the mesentery low down are apparently fixed. However, if it cannot be pulled down, then how is it going to prolapse again later? One should certainly pull it down as much as possible. In other words, is not this operation probably adequate for many people?

Having pulled the sigmoid down as far as it will go, the peritoneal sac is then closed above, and the bowel cut across.

The vessels of the rectum and sigmoid are tied, the segment of bowel thrown forward and the line of incision carried around through the sigmoid.

There are now two concentric bowel ends, one within the other, the rectal stump outside and the sigmoid inside. An anastomosis is then carried out in that fashion, using four tension sutures to prevent premature retraction before the procedure is completed.

This was an operation which for many years I hesitated to use for fear of sepsis, but it is the same operation that Ernest Miles described some years ago in which he had, as I recollect, no mortality in thirty-four cases. I have had no mortality in these patients, and have had no complications of any serious nature. The patients may have a slight fever, but they all have had streptomycin and penicillin and move their bowels spontaneously at the end of four or five days with mineral oil.

I show these slides because the amputation procedure has been quite satisfactory in my experience, except for two patients. Dr. Frykman has described a very good procedure, and I per-

* Dr. Hayden presented slides to illustrate his discussion.

sonally, by and large, prefer a clean abdominal operation to one done in a limited area through the perineum.

I think we must continue to use our judgment in choosing between the various procedures, all of which have some merit, and can be used in combination to good advantage.

HOWARD M. FRYKMAN (closing): I want to thank Dr. Hayden for his discussion. As far as perineal amputation is concerned, I also believe that it is adequate in many cases, but that it should be reserved for the older, poor-risk patients. Clinical judgment, however, must determine the operative procedure to be used.

Two of the patients in this series had had perineal amputations of the prolapsed rectum, and one had a modified Moskowitz procedure with recurrence; that is why I elected to do the abdominal operation.

I believe that the potential is greater for a permanent cure with the abdominal procedure and maximal resection of the sigmoid colon.

Proctologic Anatomy. By R. V. Gorsch. Second edition, 300 pages, 155 illustrations. Baltimore, 1955. Williams & Wilkins Co.

In this second edition Dr. Gorsch has presented many improvements over the preceeding volume. It shows the results of painstaking and extensive studies of the anatomy of the entire perineal and pelvic regions. He has approached this complex subject from the standpoint not only of the proctologist but also the urologist, the gynecologist and all interested in surgery of the pelvic and perineal regions. This work represents the results of many hours of meticulous dissections and embryologic studies by the author, as is shown by his photographic presentations. Many of these have been amplified by line drawings for better clarification. However, in some of the photographs of the dissections the lettering could have been more distinct; also, color photography would have lent more value. The carefully evaluated studies of many other workers have been presented, and a complete bibliography included. It is hoped that in the next edition the author will include a study of the remainder of the colon to make this valuable book even more complete as a guide to the proctologist and all other allied specialists.

L. J. HIRSCHMAN, M.D.,
Traverse City, Michigan

The Autonomic Nervous System in Pruritus Ani

PERIANAL SKIN TEMPERATURES AFTER SYMPATHETIC BLOCK IN CONTROL SUBJECTS

CALEB SMITH, M.D., *Wilmington, Delaware,* GEORGE M. MALKIEWICZ, M.D. (*By Invitation*), *Trenton, New Jersey,* AND GEORGE Y. MASSENBERG, JR., M.D. (*By Invitation*), *Macon, Georgia*

IN previous communications[1,2] the relief of severe intractable pruritus ani by sympathectomy of the superior hypogastric plexus (presacral neurectomy) was reported. Three cases were cited, one personal and two of patients operated upon by Cotte of France who introduced presacral neurectomy as an operation. Reference was made to demonstrating the role played by the sympathetic nervous system in pruritus ani on the basis of a fall in perianal skin temperatures greater than that shown by a small number of control subjects after block of the superior hypogastric plexus by a local anesthetic, as well as on the basis of relief of itching by such a block.

The purpose of this article is to present a study of the effects of block of the sympathetic nervous system at various levels on perianal skin temperatures in control subjects, a study that has not been made previously as far as we can ascertain. It is hoped that the results, in addition to offering an interesting commentary on our knowledge of the physiology of the rectum and anus, will serve as a basis for judging the effects of similar blocks on perianal skin temperatures in patients with pruritus ani and thereby aid in demonstrating the role played by the sympathetic nervous system in this syndrome.

METHODS AND MATERIALS

All subjects studied were either normal males or male patients with uncomplicated internal hemorrhoids. The temperature of the perianal skin in each quadrant within the pigmented border was taken with a standard thermocouple* in an air-conditioned room with a relatively stable temperature around 72°F. The patients were placed on an operating table in the prone position and covered only with a short hospital gown. The buttocks were taped apart, thus exposing the anus and perianal skin to the air. Forearms and legs were not covered. The room temperature was checked at the beginning and end of each study. The subjects were divided into four groups, as follows:

Group I: perianal skin temperatures were taken on three subjects after exposure of the anus to room temperature for a period of twenty minutes and again after exposure for forty minutes. No block of the sympathetic nervous system was done.

Group II: perianal skin temperatures were taken on five subjects after exposure of the anus to room temperature for a period of twenty minutes. A spinal anesthetic to the level of S1 was then administered. The anus was exposed to room temperature for a further period of twenty minutes, after which perianal skin temperatures were again taken.

Group III: perianal skin temperatures were taken on five subjects after exposure of the anus to room temperature for a period of twenty minutes. A block of the superior hypogastric plexus[3] was then done using a 1 per cent solution of metycaine® hydrochloride. The anus was exposed to room temperature for a further period of twenty minutes, after which skin temperatures were again taken.

Group IV: perianal skin temperatures were taken on five subjects after exposure of the anus to room temperature for a period of twenty minutes. A spinal anesthetic to the level of D11 was then administered. The anus was exposed to room temperature for a further period of twenty minutes, after which perianal skin temperatures were again taken.

* U. M. A., Inc., New York, N. Y.

RESULTS

Figure 1 depicts the changes in perianal skin temperature for each group.

Group I (exposure without sympathetic block) showed an average rise in perianal skin temperature of 0.2°F. The maximum change in any case was a rise of 1.1°F. In one case there was no change.

Group II (exposure after spinal anesthesia to S1) showed an average fall in skin temperature of 0.9°F. The maximum change in any one case was a fall of 1.2°F. The minimum change in any one case was a rise of 0.5°F.

Group III (exposure after block of the superior hypogastric plexus) showed an average fall of 1.2°F. The maximum change in any one case was a fall of 1.8°F. The minimum change in any one case was a fall of 0.5°F.

Group IV (exposure after spinal anesthesia to D11) showed an average fall of 1.6°F. The maximum change in any one case was a fall of 3.0°F. The minimum change in any one case was a fall of 0.8°F.

Table 1 summarizes the changes in perianal skin temperature in each group. The values in each group were obtained by averaging the quadrant temperatures for each subject and then averaging the values thus obtained.

perature below that of the body: Perianal skin temperatures after sympathetic block fall while those of the skin elsewhere rise.

In 1933 Sawyer and Schlossberg[4] showed that in cats exposed to an environmental tempera-

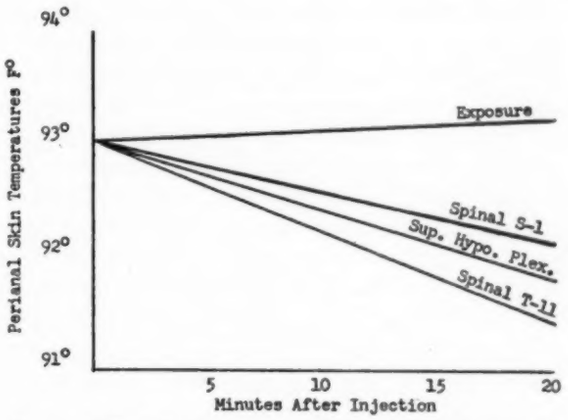


FIG. 1. The effect on perianal skin temperatures of block of the sympathetic nervous system at various levels.

ture well below that of their body, the rectal temperatures rose. If, however, the animals were subjected to spinal anesthesia prior to exposure, the rectal temperatures fell.

Our data indicate that perianal skin tempera-

TABLE 1

PERIANAL SKIN TEMPERATURES IN "NORMAL" SUBJECTS

Type of Block	After 20 min. Exposure (°F.)	20 min. after Block (°F.)	Average Change (°F.)	Maximum Change (°F.)	Minimum Change (°F.)
Exposure	92.8	93.0*	0.2	1.1	0.0
Spinal S1	93.5	92.7	−0.9	−1.2	0.5
Superior hypogastric plexus	92.7	91.5	−1.2	−1.8	−0.5
Spinal D11	93.0	91.4	−1.6	−3.0	−0.8

* No block; exposure only.

COMMENTS

These data indicate that perianal skin temperatures do not follow the usual pattern for skin temperatures after block of the sympathetic nervous system when the patient is exposed to an environmental temperature below body temperature. In fact, perianal skin temperatures after block of the sympathetic nervous system follow a pattern diametrically opposed to that shown by skin temperatures elsewhere on the body when the subject is exposed to an environmental temperatures in man when exposed to an environmental temperature below body temperature tend to follow the pattern of rectal temperatures in cats, with and without spinal anesthesia.

These findings suggest that in man the sympathetic innervation of the perianal skin within the pigmented border follows the physiologic pattern of the rectum rather than that of the skin of the remainder of the body.

Several objections to these data can be made. The changes in temperature were small. Studies conducted in a room with a controlled

temperature much lower than that used by us might be more significant. Such conditions were unfortunately not available to us. Skin temperatures are not as reliable as those taken beneath the skin, a method, also unfortunately, not available to us. It could further be argued that all changes were due to heat radiation. However, in the control cases, admittedly a small group, there was a slight rise in perianal skin temperatures, whereas in those subjects undergoing a block of the sympathetic nervous system there was a uniform fall in perianal skin temperatures. The fall was most evident in those subjected to a spinal anesthetic to the level of D11, a reasonable finding when it is recalled that the sympathetic innervation of the rectum begins to arise at this level. The authors believe that the data show a definite trend of changes in perianal skin temperatures after block of the sympathetic nervous system.

The thesis that this syndrome has the characteristics of a causalgia state is supported by these data together with our previous findings[1,2] that perianal skin temperatures in cases of severe intractable pruritus ani fell to a greater degree that did those of control subjects after sympathetic block, and that three patients with severe intractable pruritus ani were relieved by presacral neurectomy.

Currently there are two theories concerning the etiology of so-called idiopathic pruritus ani. The first, the psychiatric theory, has been ably presented by Macalpine[5] of St. Bartholomew's Hospital, London. Also, it has been shown experimentally that emotional stress can lower the threshold to itch sensation,[6] thus favoring the building up of a vicious cycle. In our opinion, however, it has not been demonstrated that emotional stress can induce the itching primarily without the aid of other factors such as local irritation.

In the second theory, pruritus ani is regarded as a causalgia state and the relationship of the sympathetic nervous system to causalgia has long been established. Wilson and Bruce[7] take note of two types of causalgia. One follows injury to a nerve trunk. The other form of causalgia, the one with which we are concerned, is caused by some disturbance of metabolism due to edema, ischemia or injury to the nerve endings.

At this point it is well to recall that there are two types of itch sensation[6] and both are somehow related to pain. The first type is physiologic itching which arises in response to weak stimuli of everyday life. This type is termed epicritic, or first itch or pain. It is sharply localized, of short duration, attended by little discomfort, conducted by myelinated fibers of 5 to 10 microns at a rate of 20 to 30 meters per second, and is carried in the posterior tracts of the spinal cord.

The second type of itching is pathologic itching evoked by morbid stimuli or is of such intensity that it causes disturbances of well-being. This type is termed protopathic, or second itch or pain. It is poorly localized, persistent, associated with burning or marked discomfort, conducted by unmyelinated fibers of 5 microns at a rate of 1 meter per second, and is carried in the anterolateral tracts of the spinal cord. This type of itching characterizes severe intractable pruritus ani.

In the light of our present knowledge of itch sensation it is interesting to consider the effects of scratching on pruritus ani. Proctologists, of course, have known about this pernicious effect for a long time, but largely on an empirical basis.

A patient with pruritus ani has a natural urge to try to relieve his unpleasant, protopathic, burning itching by scratching which overcomes in his consciousness temporarily the protopathic itch by replacing it with the epicritic type which is less unpleasant, sharper and more painful. In reality, however, the more unpleasant protopathic itch persists during the scratching and is actually re-enforced by an afterdischarge of stimuli by the induction of the epicritic itch or pain that scratching causes. Herein lies an important means of perpetuating pruritus ani.

In the causalgia theory of pruritus ani any irritative lesion of the anorectal region can set up pathologic itching. In the early stages of the syndrome removal of the irritating lesion results in cure, a fact long recognized by proctologists. If, however, the syndrome persists for a long time, it may become so well established as a causalgia state that removal of the irritating lesion will not relieve it; this state of affairs also is recognized by many proctologists. Also, in cases of long-standing, the irritating lesion may have disappeared while the well established causalgia state persists, appearing thus to be without cause. Such a sequence of events is well recognized in causalgia in other parts of the body and calls to mind the so-

called neurogenic type of pruritus ani in which there are no abnormal findings in the anorectal region.

Proctologists, as well as dermatologists and psychiatrists, have long recognized that the outlook for relief is poorer in cases of long-standing pruritus ani. The same observation has been made in causalgia states elsewhere in the body.

Since the concept of pruritus ani as a causalgia state is still a theory, interruption of the sympathetic nervous system for its relief cannot be regarded as a generally accepted therapeutic measure. The concept is, nonetheless, an interesting and promising one which warrants further study.

At present it also seems reasonable not only to continue our long-established practice of removing irritative lesions of the anorectal region in cases of pruritus ani as early as possible, but also to investigate the role played by the sympathetic nervous system in severe intractable cases of pruritus ani by blocking the superior hypogastric plexus of the sympathetic nervous system with a local anesthetic. Temporary relief of itching after such a block suggests that a causalgia state exists. As in the case of early causalgia in other parts of the body, repeated blocks may effect permanent remission of symptoms.

CONCLUSIONS

Perianal skin temperatures fall after an appropriate block of the sympathetic nervous system when the subject is exposed to an environmental temperature below that of the body. Such a response is similar to that of the rectum under the same conditions and is diametrically opposed to the response of the skin of the remainder of the body.

The concept of severe intractable pruritus ani as a causalgia state and the relationship of the autonomic nervous system to this syndrome have been discussed.

REFERENCES

1. Smith, C. H. and Malkiewicz, G. M. Relief of severe pruritus ani by presacral neurectomy. *U. S. Armed Forces M. J.*, 5: 894–897, 1954.
2. Smith, C. H. and Malkiewicz, G. M. Role of the autonomic nervous system in intense pruritus ani. *J. Internat. Coll. Surgeons* (in press).
3. Flothow, P. G. Relief of pelvic pain. *Southb. Surgeon*, 4: 36–43, 1935.
4. Sawyer, M. E. M. and Schlossberg, T. Studies of homeostasis in normal, sympathectomized and ergotamized animals. 1. The effects of high and low temperatures. *Am. J. Physiol.*, 104: 172–183, 1933.
5. Macalpine, I. Pruritus ani; a psychiatric study. *Psychosom. Med.*, 15: 499–508, 1953.
6. Mescon, H. and Moretti, G. Pruritus—newer concepts of mechanism and treatment. *Pennsylvania M. J.*, 58: 399–402, 1955.
7. Wilson, S. A. K. and Bruce, A. N. Neurology, 2nd ed., pp. 318–319. Baltimore, 1955. Williams & Wilkins Co.

DISCUSSION

Durand Smith (Chicago, Ill.): When one is asked to discuss a presentation which is not too familiar, and especially if the data do not follow standard or orthodox patterns, he is more likely to be critical in his approach and to view the results with suspicion. This was my first reaction.

The studies which Dr. Smith and his associates presented cover two very complex subjects which are not too well understood, which are still controversial in spite of voluminous research, and which will require further investigation. These subjects are the control of body temperature and pruritus ani.

Body temperature is controlled by the autonomic nervous system. The capacity to maintain normal body temperature is lost following destruction of the hypothalamus, is greatly disturbed by the transection of the cervical spinal cord and is altered in certain procedures in which specific pathways are blocked.

The neural regulation of body temperature is effected through end organs in blood vessels, sweat glands, internal organs (through metabolic processes) and the glands of internal secretion. Since many factors influence changes in body temperature, these organs are subject to rather constant excitation and inhibitory impulses from higher centers. It is the disturbance of conduction of these impulses, specifically blocking of the sympathetic chain at the level of the superior hypogastric plexus, with resultant changes in perianal skin temperatures that forms the basis of this presentation.

The subject of pruritus ani is far too complex to discuss, but the initiation and mediation of the itch impulse is pertinent to this discussion.

Itching arises exclusively in the epidermis or the corresponding epithelial layer of the transitional mucous membrane through one of three ramifying axons in the skin, e.g., the sympathetic, the antidromic vasodilator and the protopathic sensory system, all consisting of small unmyelinated fibers and all mediating diffuse effects by means of axon reflex impulses and in turn mediated by the slowly conducting C fibers of Gasser and Erlanger of peripheral nerves. When these peripheral pain nerves discharge into the cord at low frequency,

circuits of internuncial neurons are established with a consequent patterned discharge up the spinothalamic tracts. Any disturbance or alteration along any portion of the transmitting system will affect or remove the sensation of itching. A depression of the synaptic transmission of impulses through sympathetic ganglia will also affect itching and this is probably the explanation for the results claimed by the authors. Just why presacral neurectomy relieves perianal itching cannot be explained logically. This procedure does not affect complete sympathetic denervation of the pelvic viscera since the sacral and the more caudal lumbar sympathetic rami join the pelvic plexuses directly. It probably interrupts all the visceral afferent fibers associated with the sympathetic nerves that reach the pelvic viscera, but does not block parasympathetic visceral afferent impulses.

Relative to the data presented by the authors I would like to point out first that if the average of all eighteen cases is taken, instead of three, the average temperature twenty minutes after exposure is 93°F. Hence there would then be no change in Group I. Also, there would be a drop of only 0.3°F., and a fall of 1.5° and 1.6°F. in Groups III and IV.

We attempted to confirm the findings as reported by the authors. Six patients were given spinal anesthetics to the level of T8 (Alberts, personal communication). In all six there was no change in rectal temperature. In three cases there was a rise of 1°C. in the perianal skin, and in the other three there was only a slight perceptible rise. No decrease in the perianal skin temperature was noted.

Two patients were tested under caudal anesthesia. In one case in which the room temperature was 72°F. there was a decrease in the rectal temperature of 0.6°F., in the thighs 1.2°F., and a fall of 1.2°F. in the perianal skin. In the other case tested at a room temperature of 85°F. there was a rise of perianal skin temperature of 2°F. and 1.5°F. rise in the skin temperature of the thighs.

Perhaps the difference in skin temperature findings may be due to a difference of environmental temperatures. This is in keeping with the work done on sympathectomized cats by Sawyer and Schlossberg which was referred to in the paper under discussion. The body temperatures fell when the environmental temperatures were low and rose when the outside temperatures were high. Without the governing control of the sympathetic nervous system the body temperatures may not be stable but may respond to environmental temperature changes.

There is a great deal of local variation of the perianal skin. As much as 1 degree change may be noted in the opposite lateral walls of the anal verge in the same individual. Slight increase of pressure on the thermocouple will cause a change in the recording. Since many factors may effect adversely the recording of skin temperatures, it may be difficult to arrive at accurate normals.

I think further study of this problem is indicated. Presacral neurectomy is a formidable procedure, but at times intractable anal pruritus requires heroic measures. I am sure that there are many patients with pruritus ani who undergo abdominal surgery. Presacral neurectomy performed on these individuals would provide information relative to the efficacy of this procedure.

I wonder how many patients have undergone this operation and with what results. How long does the absence of pruritus persist? Does the temperature return to normal? Are there any complications? Can alcohol be injected without harm in this area? Does the preoperative use of such medications as atropine, scopolamine and morphine, or epinephrine or other pressor substances influence the findings?

In conclusion I would like to commend the authors for their presentation, not only for the amount of work and effort which it entailed, but also for their offering of a new approach to the problem of pruritus ani.

The Challenge of the Colorectal Adenomatous Polyp

ALEXANDER E. ROSENBERG, M.D., *Miami Beach, Florida*

REFERENCES to the Vital Statistics Bulletins of the Federal Security Commission[1] and the Metropolitan Life Insurance Company of New York[2] indicate that the total number of deaths from carcinoma of the large intestine and rectum (for the years 1946 to 1952) remain proportionately constant, rising only by small increments to parallel the increase in population. (Table I.) I understand that the figures for 1954 may exceed 37,000.

TABLE I

Year	Large Intestine	Rectum	Total
1946	21,854	10,037	31,891
1947	22,555	10,528	33,183
1948	22,860	10,834	33,288
1949	22,949	10,309	33,258
1950	23,000	10,383	33,383
1951	23,517	10,103	33,620
1952	23,482	10,332	33,814

Present day achievements in surgical knowledge, surgical technic and biochemical therapeutic aids have not influenced these numbers. Obviously any attempt to reduce these figures must necessarily envisage some method of eliminating those lesions which we believe are the antecedents of carcinoma. The best opportunity to influence this death rate lies in the eradication of adenomas of the colon and rectum.

The purpose of this paper is to demonstrate some basic controversial problems in their diagnosis and therapy.

In 1890 Hauser pointed out that polyps with certain types of cell changes were potentially malignant; eighteen years later Verse accepted this as evidence of an irreversible cytologic change necessarily leading to carcinoma. Since then many studies have confirmed the premalignant nature of colonic adenomas. I need only mention Westhues,[3] Helwig,[4] Swinton and Warren,[5] Bacon and Broad,[6] Buie and Brust,[7] and Martin.[8] One of Helwig's conclusions in his classic paper states, "Some carcinomas of the large intestine arise directly from the mucous membrane but the majority develop in adenomas."

The frequency of these reported changes varies considerably; accordingly, any discussion of this subject must contain a clear definition of what is meant by a carcinoma in an adenoma. The problem is not as easy as it sounds.

Swinton and Warren classified their criteria in three major groups, namely, anaplasia, architectural changes and invasion. In their opinion evidence of any two of these three changes indicates that the lesion is malignant. These criteria were used by Helwig in his study of the material in 1,460 autopsies. To determine to what extent they might prove acceptable and perhaps to lessen the confusion among some of us, a survey was made and the following questions were directed to the Chairmen of the Departments of Pathology in fifty-eight medical colleges of the United States and Canada.

Which of these findings do you believe warrants a diagnosis of carcinoma in an adenoma: either one, any two or all three?

1. Atypism—young cells which vary in size, shape and deep staining qualities of the nuclei; numerous mitotic figures, loss of nuclear polarity and stratification.

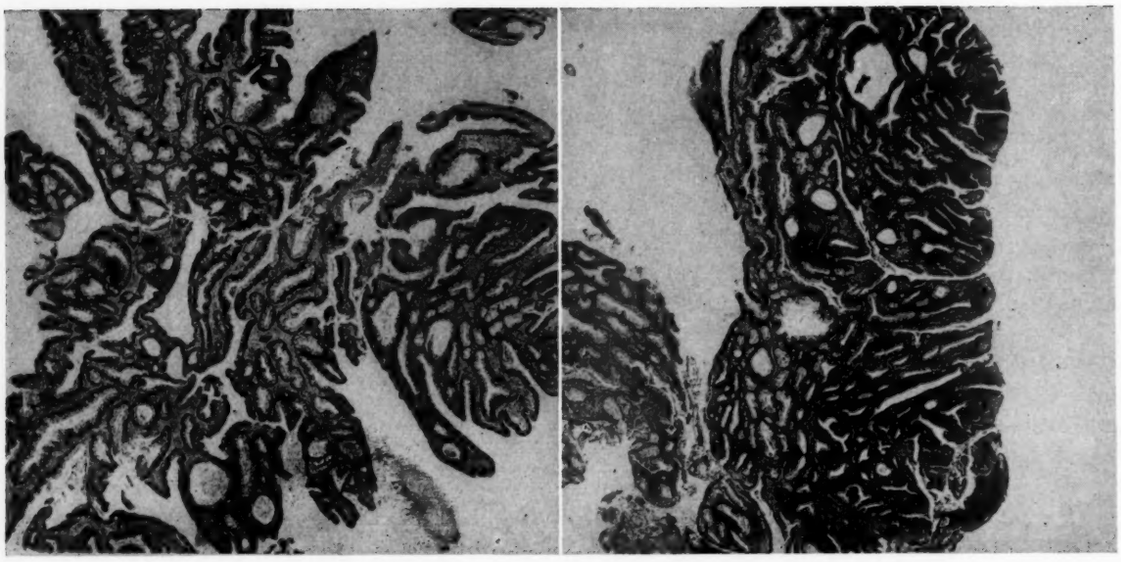
2. Architectural changes—elongation and budding of the glands, distortion with loss of relationship to the surrounding structures giving rise to clumping and scattering.

3. Invasion.

4. If in your opinion these are unsatisfactory, please state those changes which you would consider necessary to a diagnosis.

SURVEY ANALYSIS

A study of the breakdown of these answers is presented in Table II. One is immediately



1 2

FIG. 1. Case 1. Photomicrograph (original magnification × 24) of an adenomatous polyp showing atypical changes only.

FIG. 2. Same patient. Recurrence at original site with similar changes.

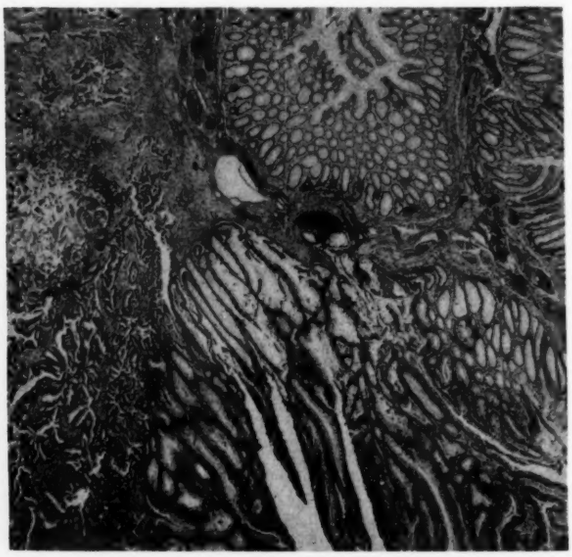


FIG. 3. Case 1. Photomicrograph of resected bowel showing adenocarcinoma invading to the serosa.

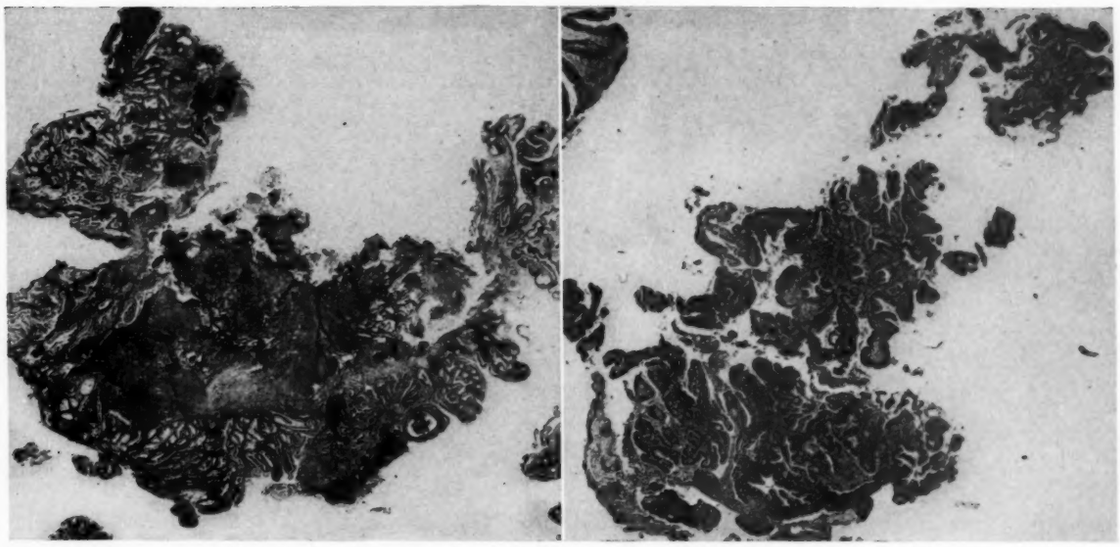
impressed by the wide disagreement which continues to exist. On the general question of atypism, eight pathologists would make a diagnosis of carcinoma in an adenoma, eleven would not; nine would be suspicious of it; three would require a combination with architectural changes; one with architectural changes and invasion, one with invasion only. One would not commit himself, stating that it was largely a subjective conclusion based on his own personal experience.

The analysis on architectural changes was likewise divergent. Seven would diagnose carcinoma on this change alone, whereas ten would not; but ten would continue to be suspicious. In underlined notations, several

TABLE II

	Atypism	Architectural Changes	Invasion
Yes	8	7	24
No	11	10	0
Suspicious	9	10	0
Atypism	0	4	0
Architecture	3	0	1
Invasion	1	1	0
Architecture invasion	1	0	0
Invasion atypism	0	1	0
Atypism architecture	0	0	1
Not necessary	0	0	8
Subjective	1	1	1

believed that this was the least important change of all. As with atypism, some pathologists required combinations; one with invasion, four with atypism. Two required a subjective interpretation. Only on the findings of invasion was there general agreement. Twenty four, or 66 per cent of the total, concurred with the statement that invasion was the absolute sign upon which their diagnosis was unquestioned.



4 5

FIG. 4. Case II. Photomicrograph of an adenomatous polyp with diagnosis of adenocarcinoma without stalk involvement.

FIG. 5. Same patient. Recurrence with diagnosis of adenocarcinoma based on penetration through the basement membrane in one small area only.

On the other hand, eight pathologists reported that this finding is unnecessary in making a diagnosis of carcinoma in an adenoma.

One required architectural changes, one continued to combine all three, and one persisted in his belief that the personal equation only was paramount.

I should now like to present a series of cases of adenomatous polyps with carcinomatous changes, to compare these with the survey and once again to raise the question of therapy.

CASE REPORTS

CASE I. This patient was a sixty-eight year old white man. A polyp, 2½ cm. long, was found 15 cm. from the anorectal line. The stump was short and thick; the surface was lobulated, dull, rose-pink and friable. Pathologic diagnosis of a total biopsy was adenomatous polyp with atypism and no evidence of malignancy. (Fig. 1.) A recurrence three weeks later had a similar pathologic report. (Fig. 2.) A bowel resection, refused for five months, was then performed at which time the lesion appeared as a flat irregular area 2 cm. wide and resembling granulation tissue projecting above the surface of the surrounding mucosa. (Fig. 3.) Pathologic diagnosis of the resected bowel showed an adenomatous polyp with a small central area of carcinoma infiltrating to the serosa.

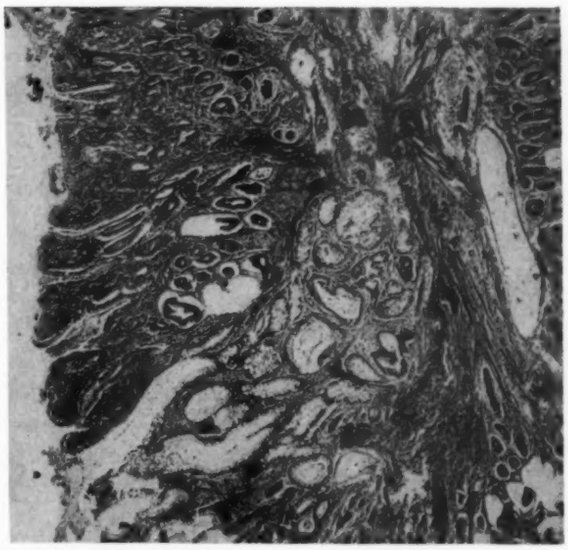
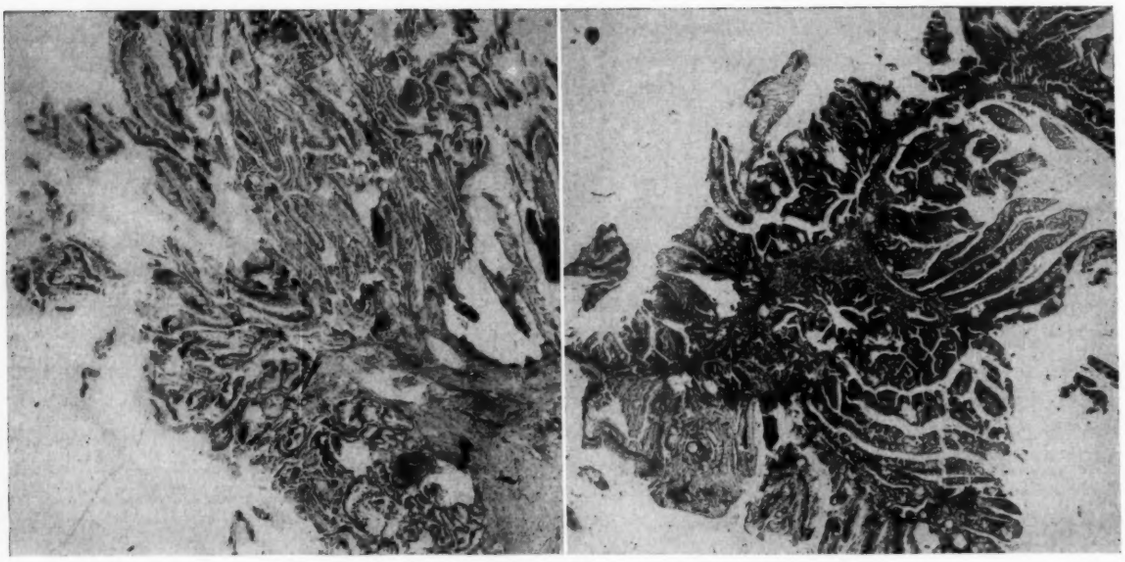


FIG. 6. Case II. Photomicrograph of resected rectum with diagnosis of Dukes class A adenocarcinoma.

CASE II. This patient was a fifty year old white man. A polyp, 4 cm. wide on an unusually long thick stalk, was found about 8 cm. from the anorectal line. Pathologic diagnosis after total biopsy was adenocarcinoma developed in an adenomatous polyp. There was no involvement of the base of this stalk. (Fig. 4.)

One year later pathologic study of a recurrence revealed one small area in which the basement membrane only had been pene-



7 8

FIG. 7. Case III. Photomicrograph of an adenomatous polyp with atypical cellular changes only. There is no involvement of the stalk.

FIG. 8. Same patient. Recurrence of adenomatous polyp with diagnosis of adenocarcinoma based on atypical and structural changes only. There is no involvement of the stalk.

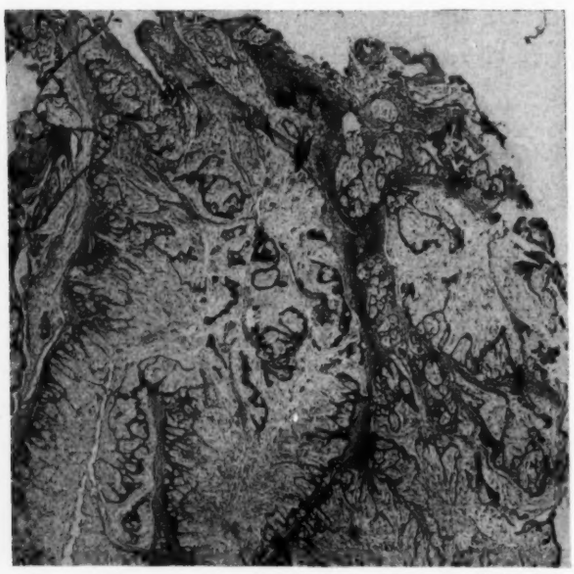


FIG. 9. Case III. Metastatic lesion in superficial left inguinal node two years later. (This includes seventeen months after abdominoperineal resection.) There was no invasion of the stalk or base in the original polyp or in the recurrence.

trated. (Fig. 5.) There were no invasive findings other than this one year ago, or now. A sphincter-preserving procedure was performed and carcinoma of the Dukes class A type was reported by the pathologist. (Fig. 6.)

CASE III. This patient had a spherical-shaped polyp removed from the posterior rectal wall. The polyp was 2½ cm. wide on a short thick stump about 4 cm. above the anorectal line. Pathologic diagnosis was "adenomatous polyp of the rectal mucosa with alloplastic reaction. Please note that the pedicle like arrangement shows no infiltration. In spite of this, I feel that the restlessness of the epithelium and morphology of the nuclei indicate a warning to be on the alert." (Fig. 7.)

Four years later a 13 mm. polyp recurred and the diagnosis was adenocarcinoma based on atypical and structural changes only. (Fig. 8.) An abdominoperineal resection was performed, at which time no glandular or surrounding structures were found to be involved. Two years after this procedure a mass in the left inguinal region developed which was excised by radical groin dissection. (Fig. 9.) All nodes were free from involvement except the superficial inguinal glands which contained metastatic adenocarcinoma of the large intestine.

COMMENTS

From the data presented it is obvious that we are still confronted with wide disagreement regarding diagnostic criteria and therefore perhaps therapeutic approach. It is apparent from the survey that what may be a carcinoma in an adenoma in one locality is only a sus-

picious lesion in another and of little significance in a third. Many of us have accepted Swinton's first two premises as sufficient criteria for a diagnosis. However, only four of thirty-five pathologists accept this view. For those who believe with Schiller[10] and Broders[11] that simple confinement to, or penetration of, a basement membrane by a cell does not decide its malignancy, it is well to note that 67 per cent of the entire group agreed that invasion is the only absolute basis for a positive diagnosis. It appears that the weight of the solution rests more on the shoulders of the man who expresses it, rather than upon the histologic appearance of the lesion itself. Several of the pathologists queried took special pains to emphasize this very point.

Obviously, the problem of therapy reflects itself in this confused picture. One must ask whether radical surgical excision offers the first and most favorable opportunity for a cure, or whether it is a needlessly extensive approach to a lesion which is temporarily limited.

The patient in the first case presented an adenomatous polyp showing atypism only. Following conservative therapy carcinoma later developed in the bowel wall.

The patient in the second case described presented atypism and structural changes in the original tumor with basement cell involvement in one small area in the recurrence. However, in no instance was there stalk involvement yet a Dukes class A carcinoma was diagnosed from the resected specimen.

The third case presented demonstrates a polyp with atypical changes which was removed. Four years later a recurrence occurred exhibiting atypical and structural changes without stalk involvement. Two years after this was excised (including seventeen months after the abdominoperineal resection) metastasis to the superficial inguinal lymph nodes was proved.

Our present conservative therapeutic approach to these tumors is based upon the involvement of the stalk, and the belief that local reactivity must first precede dissemination. This is a basic concept which future observation may refute. Lockhart-Mummery and Dukes[12] reported four cases in which they believed extrarectal lymphatic spread preceded any form of local manifestation. Barringer et al.[13] showed that while methods currently used to estimate dissemination by direct extension, sedimentation and lymphatic involvement are accurate, the more important matter of blood vascular spread studies by histologic methods have never given results corresponding to the known frequency by which these channels distribute cancer cells. "Thirty per cent of patients with carcinoma of the large intestine and rectum exhibit metastasis to the liver without even minor lymphatic involvement."

Obviously then stalk involvement does not necessarily tell the whole story. The basic and fundamental solution probably rests in the degree of malignant potential of the cells themselves. Can this factor be determined by pathologic study as Lockhart-Mummery and Dukes suggest into low, medium, average or high? If pathologists cannot agree on the larger phases of this problem, how much less common ground will they find in the more precise and difficult task of classifying cellular potential. An attempt to give some guidance to the surgical approach to carcinomatous polyps has been given by Lockhart-Mummery and Dukes. These authors stated that each tumor should be judged on (1) the extent of the invasion, (2) the degree of malignancy and (3) the size of the free margin. In none of the cases I presented would this information be of any value.

SUMMARY

Statistical evidence has been presented to indicate that the mortality from carcinoma of the large intestine and rectum has remained unchanged in the past six years and probably will for many more.

References have been cited upholding the concept that the majority of carcinomas of the large intestine and rectum develop in adenomatous polyps.

A report of a survey from thirty-six medical schools regarding diagnostic criteria in these polyps is presented indicating a considerable divergence of opinion.

A series of cases has been presented to demonstrate the inadequacy of conservative therapy based solely on histologic study.

CONCLUSION

We are still concerned about the flat stalk, the thin stalk, the long stalk, the short stalk; whether it is located on the posterior wall or

the anterior wall; whether it is above the reflection or below the reflection. We are involved with definitions and questions of interpretations and we wait for recurrences. While doing all this should we not give thought to the words of John Deaver who once said of a similar problem, "To wait for a hair splitting diagnosis does one sure thing for the patient; it hastens his trip to the grave."

Are we supporting this march by a conservative approach to the polyp with carcinoma?

REFERENCES

1. Vital Statistics of the United States. United States Department of Health, Education and Welfare, 1954.
2. Mortality from malignant neoplasms by site, sex and age. *Statist. Bull. Metrop. Life Insur. Co.*, 33: 1952; Personal communication from Marks, H. H., Medical Statistician, Metropolitan Life Insurance Company of New York, 1954.
3. Westhues, H. Die pathologisch-anatomischen Grundlagen der Chirurgie des Rektumkarzinoms. Leipzig, 1934. Georg Thieme. (Abstracted by Martin, G. L. *Am. J. Digest. Dis.*, 1: 745–746, 1934–35.)
4. Helwig, E. B. The evolution of adenomas of the large intestine and their relation to carcinoma of the rectum. *Am. J. M. Sc.*, 215: 24–32, 1948.
5. Swinton, N. W. and Warren, S. Polyps of the colon and rectum and their relation to carcinoma. *Surg., Gynec. & Obst.*, 84: 36–49, 1947.
6. Bacon, H. E. and Broad, G. G. Pathogenesis of adenomatous polyps in relation to malignancy of the large bowel. *Rev. Gastroenterol.*, 15: 284–288, 1948.
7. Buie, L. A. and Brust, J. C. M. Solitary adenomata of the rectum and lower sigmoid. *Tr. Am. Proct. Soc.*, 36: 57–67, 1935.
8. Martin, W. J. Polypoid versus carcinomatous lesions of the colon and rectum. *South. M. J.*, 33: 428–430, 1940.
9. Bacon, H. E., Laurens, J. and Peale, A. R. Histopathology of adenomatous polyps of the colon and rectum. *Surgery*, 29: 663–677, 1951.
10. Schiller, W. Criteria for the diagnosis of malignancy in rectal polyps. *J. Nat. Cancer Inst.*, 7: 393–394, 1947.
11. Broders, A. C. Carcinoma in situ contrasted with benign penetrating epithelium. *J. A. M. A.*, 99: 1670–1674, 1932.
12. Lockhart-Mummery, H. E. and Dukes, C. E. The surgical treatment of malignant rectal polyps. *Lancet*, 2: 751–755, 1952.
13. Barringer, P. L., Dockerty, M. B., Waugh, J. M. and Bargen, J. A. Carcinoma of the large intestine; a new approach to the study of venous spread. *Surg., Gynec. & Obst.*, 98: 62–72, 1954.

DISCUSSION

Douglas Sunderland (Rome, N. Y.): It has been a great pleasure hearing Dr. Rosenberg's paper, but in discussing it as a pathologist I have the uncomfortable feeling that I am swimming upstream.

Dr. Rosenberg has emphasized the continuing high death rate from cancer of the large bowel. He has indicated that the majority of these cancers originate in adenomatous polyps, has given evidence of the divergence of opinion among pathologists concerning the criteria for diagnosis of carcinoma in an adenoma, and presented three cases to demonstrate the inadequacy of conservative therapy based solely on histologic study.

I thoroughly agree with Dr. Rosenberg that the best way to influence the death rate from cancer of the large bowel is to eradicate adenomas of the colon and rectum. There is no question that a large proportion of these cancers arise in preexisting adenomas. Whether the majority actually do still remains to be proved.

In regard to the diagnosis of carcinomatous change in an adenoma, the pathologist is faced with a double question. First, is there histologic evidence that an irreversible cellular change has taken place, which indicates that if the adenoma is not removed or is incompletely removed, it will in time become a clinical cancer with ultimate metastasis? Second, if such a malignant change has occurred, is there a likelihood that the cancer has already extended beyond the polyp and immediate radical surgery should be advised?

There will continue to be a divergence of opinion among pathologists until the experience of all of them coincides. The same divergence of opinion exists today concerning criteria for the diagnosis of *in situ* and invasive carcinoma of the cervix which is a somewhat analogous problem.

I personally believe that a differentiation should be made between *in situ* carcinoma and invasive carcinoma arising in an adenoma. I make a diagnosis of *in situ* carcinoma if the cellular structure in some areas is identical with that seen in a cancer invading the bowel wall, but there is no demonstrable penetration of the basement membrane. This appearance is largely dependent on nuclear variation, i.e., size and shape of the nuclei, loss of polarity and variation of chromatin content. If there is penetration of the basement membrane, it is invasive carcinoma.

In my own experience and, I am told, in the experience to date of the Colon and Rectum Service at Memorial Center there has not been a recurrence or metastasis following complete local removal of an adenoma containing focal cancer that did not show lymphatic infiltration of the submucosa.

This lymphatic infiltration of the submucosa does not necessarily mean invasion of the stalk. I think this point is important, because the submucosa is drawn up to the apex of the stalk within the substance of the adenoma.

The statement does not apply to pedunculated cancers which have only a small area of benign structure remaining. It does not apply to cancer arising in papillary adenomas (villous tumors) nor to adenomas that are incompletely removed.

The necessity of multiple microscopic sections to determine the status of the cancer and the completeness of removal cannot be stressed sufficiently. In order to evaluate an adenoma which shows malignant change and to tell the status of the cancer, you have to embed the whole lesion almost completely, or you are in no position to offer any data that will assist in prognosis.

In view of the cases that Dr. Rosenberg has presented, it is possible I shall have to revise my views. However, there are several questions I should like to raise. In the first of his cases there was apparent recurrence within three weeks of initial removal. Is it possible that the removal was incomplete, and this represented residual tumor rather than recurrence?

In view of the four-year interval between the removal and recurrence in the third case, can the possibility be ruled out that this was a new lesion rather than a recurrence?

After looking at the illustrations and from the appearance of that recurrent lesion, I would classify it definitely as an invasive cancer.

The polyps varied from 2.5 to 4 cm. in diameter, which is fairly large. Were multiple sections taken of each lesion to demonstrate complete removal and to rule out definitely the presence of invasion?

Dr. Rosenberg's paper by inference stresses the necessity for repeated personal conference between the proctologist and the pathologist throughout the management of a case of an adenomatous polyp in which there is malignant change. It is only through the accumulation of experience by this type of collaboration that the answer to this perplexing problem can be obtained.

ALEXANDER E. ROSENBERG (closing): The adenomatous polyps in these cases were removed *en masse* by electrothermal snare down to the bowel wall. The pathologic studies were made on serially sectioned specimens.

I should like to see this Society establish a tumor committee. The purpose of this group would be the collection of pertinent information relative to the pathologic diagnosis, the treatment and the follow-up of each polyp seen by a member of this Society during the ensuing years. At the end of five years, possibly more, sufficient data would be available which might point to the answers on this important subject.

My deep appreciation to Dr. Sunderland for his fine discussion.

Barium Granuloma of the Rectum Following Barium Enema

CASE REPORT

LYLE W. SWARTZ, M.D., *Milwaukee, Wisconsin*

A BARIUM granuloma in the anorectal region following a gastrointestinal series furnishes the basis of this case report. Only one previous case of barium granuloma of the rectum has been reported to date.[1] Because of the extensive use of barium in x-ray studies of the digestive tract it seems unusual that more of these cases do not occur, or are not reported.

Barium has been observed entering the peritoneal cavity through perforations of the alimentary tract.[2]

Refvem[3] has done considerable work on lesions diagnosed as foreign body granuloma. In Refvem's series the highest incidence of foreign body granulomas was in the anorectal region, and 75 per cent of these were attributed to talc. Barium was not identified as a causative agent in any of his cases.

Theoretically it would be possible for barium ingested orally or instilled into the rectum to lodge in a crypt, fissure, internal fistulous opening, or any break in the mucous membrane, and to infiltrate the deeper tissues causing a barium granuloma. Such a condition may be acute, and evident at once if sensory nerve fibers are present in the area involved; or it may become chronic and undetected for sometime if no sensory nerves are involved.

CASE REPORT

The patient, a white man of fifty-six years, received a barium enema in the usual manner on February 27, 1954. X-rays were taken, but there was no evidence of pain or unusual symptoms until the patient began expelling the barium. While expelling the enema he noticed a sharp excruciating pain in the rectum followed by a spasm of the rectal musculature. He then noted a perianal lump which was tender and painful.

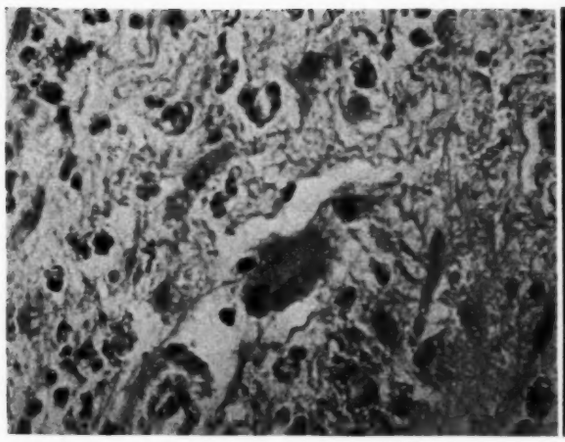
Rectal examination four hours later revealed a posterior anal swelling which resembled an acute external thrombosis or abscess.

At the time of surgery an open, sloughed out cavity together with a short fistulous tract was found in the posterior quadrant. Proctosigmoidoscopic examination at this time was negative. The lining of the fistulous tract and cavity consisted of a brilliantly white material unlike anything previously encountered. The entire posterior quadrant was ulcerated, sloughed out, and lined with the white material.

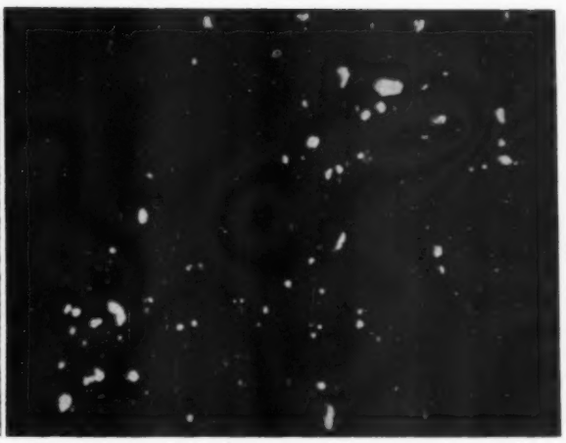
The fistulous tract was opened and excised. The area about the fistulous tract was dissected out deeper into the posterior anal space between the anus and coccyx. The most remarkable thing was the depth to which the white discoloration had penetrated. After excising as much tissue as feasible without permanently altering the anal anatomy there were still traces of this white substance present. Except for the white color this tissue appeared intact and was in no way connected with the fistulous tract, which was much more superficial. All tissues were sent to the laboratory with instructions to confirm the presence of barium in the tissues removed, if possible.

Pathologically the gross specimen consisted of three pieces of tissue measuring from 1 to 3 cm. and was covered in part by mucous membrane. The underlying tissue was diffusely infiltrated by gray-white streaking and pigmentation.

Microscopically the tissue was covered in part by stratified squamous epithelium and mucous-secreting epithelium. It showed hyperkeratosis. Within the underlying tissue diffuse chronic inflammation was noted, characterized by marked vascular and inflammatory cell infiltration. In addition there was abundant crystalline material. The individual crystals were sheath-like and jagged and quite small measuring up to 50 millimicra. (Figs. 1 and 2.)



1

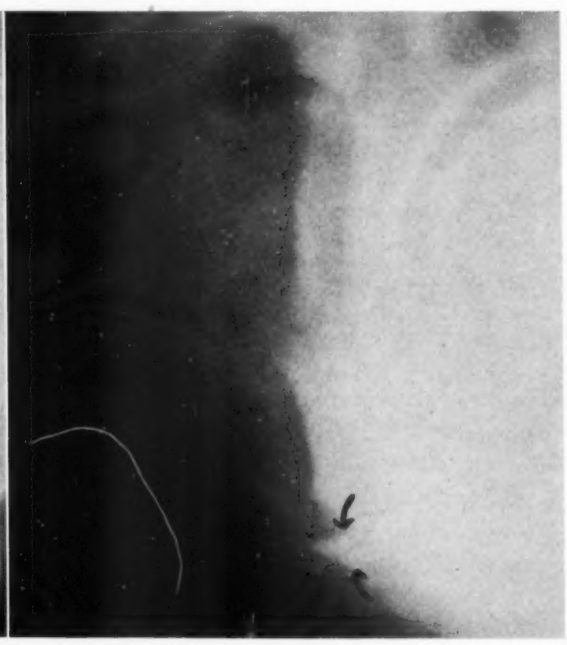


2

FIG. 1. Photomicrograph of submucous tissue of rectum showing diffuse, chronic inflammation characterized by marked vascular and inflammatory cell infiltration. Several large mononuclear cells are in evidence. All varieties of inflammatory cells are present.

FIG. 2. Same as Figure 1 under polarized light showing barium crystals and deposits in tissue.

3



4

FIGS. 3 and 4. Anteroposterior and lateral films of rectum and anal region showing small amount of dense, opaque material identified as barium between the coccyx and epidermis posterior to the anal margin.

Diagnosis was chronic inflammation with foreign body (barium granuloma).

The pathologist then sent the specimen to a research laboratory to obtain positive identification of the elements present on a quantitative as well as qualitative basis.

The analysis showed barium to be present in the ratio of 100,000 parts per million on a dry basis. (Table 1.)

Eleven days postoperatively the patient was referred for flat plate x-rays of the buttocks and pelvis. Two plates were taken which revealed definite amounts of barium between the coccyx and epidermis posterior to the anal margin. These x-rays merely served to confirm the existence of barium in the tissues. (Figs. 3 and 4.)

CONCLUSION

It is the author's conclusion that while the patient was expelling the barium enema some

of the barium penetrated a deep crypt or internal fistulous opening and was forcefully injected into the loose submucous and areolar tissue of the posterior rectal space as the patient was straining at stool. This caused the sudden pain and swelling, which was due to barium being forced into the tissues.

TABLE 1*

MATERIAL FROM RECTUM

The entire 45 mg. mass of desiccated sample was used for analysis. The probable amounts of significant elements are:

Ba	10,000	100,000 p.p.m. dry basis
Si	500	2,000 p.p.m. dry basis
Pb	100	400 p.p.m. dry basis
Sn	50	200 p.p.m. dry basis
Be	0	10 p.p.m. dry basis

* Analysis by Allis Chalmers Mfg. Co., Research Laboratories, Milwaukee, Wis.

SUMMARY

A barium granuloma of the anorectal region is reported. The cause and treatment of the lesion is discussed. Although such cases may be more common than the literature would indicate, this appears to be the second case reported.

REFERENCES

1. BEDDOE, H. L., KAY, S. and KAYE, S. Barium granuloma of the rectum. *J. A. M. A.*, 154: 747, 1954.
2. KLEINSASSER, L. J. and WARSHAW, H. Perforation of the sigmoid colon during barium enema. *Ann. Surg.*, 135: 560–565, 1952.
3. REFVEM, O. Chronic granulomas in alimentary tract caused by minute mineral particles. *Acta path. et microbiol. Scandinav.*, 25: 107–121, 1948.

Dermatologic Concepts and Management of Pruritus Ani

JOHN L. FROMER, M.D. (*By Invitation*), *Boston, Massachusetts*

From the Department of Allergy and Dermatology, The Labey Clinic, Boston, Massachusetts.

IN spite of the advances in our knowledge and management of dermatitis, the treatment of patients with pruritus ani is a difficult and, at times, a baffling problem. The purpose of this paper is to review some of the basic dermatologic concepts related to the production of dermatitis with its attendant pruritus. A system of treatment will also be proposed.

Classification. Many authors have reviewed the etiology and management of pruritus ani and most of the recent ideas concerning this subject have been reported by Swinton,[1] Turell,[2] Becker[3] and others. The author has worked alongside Swinton in the management of these problems and agrees wholeheartedly with his approach to the subject. These reviews mention the known causes which include local and systemic diseases resulting in pruritus ani. Roughly 25 per cent of our patients at the Lahey Clinic have anorectal problems which are best dealt with by the proctologist, and the pruritus improved by the necessary surgical measures so instituted. This surgery is directed at the correction of obvious anorectal disorders. About 20 per cent of our patients have other dermatologic diseases which are readily manifest when the entire cutaneous surface is exposed. Psoriasis, seborrheic dermatitis, mycologic and bacterial dermatitis, and atopic dermatitis account for most of the dermatologic conditions which involve the anogenital area. A fair number of patients are seen with lichen sclerosus et atrophicans which is considered by some to be a variant of lichen planus, and by others a variant of kraurosis. It is usually accompanied by intense itching but there are other manifestations of the disease chiefly on the shoulders, wrists and forearms which readily help to make the diagnosis. Perhaps the most resistant patients as far as management is concerned are those with so-called essential pruritus ani (about 45 per cent). The remainder of our patients suffer from systemic diseases including diabetes, lymphoblastomas, liver disease, parasites, kidney disease or cancer elsewhere than the rectal area, associated with pruritus ani. (Table 1.)

TABLE 1
CLASSIFICATION OF PRURITUS ANI

Surgical (25%)	
Fissures	Papillitis
Fistulas	Cryptitis
Draining sinuses	Skin tags
Ulcers	Internal hemorrhoids
Mucosal prolapse	Neoplasms
Dermatologic (65%)	
Psoriasis	Lichen sclerosus
Seborrheic dermatitis	Syphilis
Bacterial dermatitis	Contact dermatitis
Mycotic dermatitis	Essential (idiopathic) (45%)
General (10%)	
Diabetes—liver	Allergy:
Parasites	"Caines"
Lymphoma	Hygienic pads
Antibiotics	Deodorants
	Foods

Histopathology. Many authors have referred to a wet and dry type of pruritus ani. To the dermatologist, this distinction is only a matter of degree in the same type of process. Most dermatologists consider that the terms dermatitis and eczema may be used interchangeably. Eczema is described by Lever[4] as an inflammation of the skin based on its allergic response to a variety of agents such as chemicals, proteins, bacteria and fungi. The exciting allergen may act on the skin either from the outside (epidermal sensitization) or from the inside (vascular sensitization). Dermatitis, or eczema, may be acute, subacute or chronic. While the clinical picture is characterized by polymorphism of the eruption, usually the skin is lichenified, or thickened and purplish-hued, with or without fissures, scaling or crusting in the anogenital area. In the acute phase, how-

ever, actual weeping or a so-called wet pruritus ani may be seen. Histologically, in acute dermatitis the epidermis presents intercellular edema (spongiosis), intracellular edema and microscopic intraepidermal vesiculation.

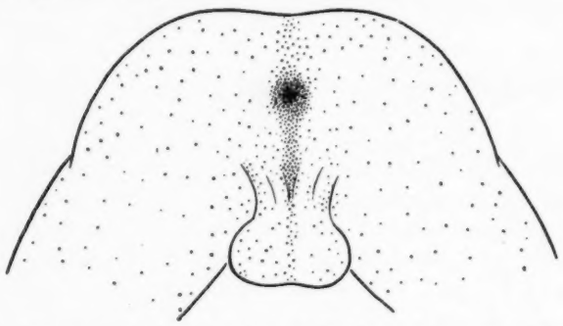


FIG. 1. Relative density of itching points in male anogenital region. (Modified from Shapiro and Rothman, *Gastroenterology*, 5: 155–168, 1945.)

In areas of more severe intracellular edema, the cells undergo liquefaction necrosis and disintegrate. According to some authors, the areas of epidermal liquefaction necrosis attract fluid from the corium because of a physical-chemical force which they possess. The passage of tissue fluid through this type of damaged epidermis is then an easy matter, resulting in weeping clinically. It is rare to see vesicles clinically in the immediate perianal zone limited to 3 to 4 cm. of the anus. On the glabrous skin beyond this zone, vesicles are not uncommonly seen following the use of some sensitizing preparation.

In the dry form of pruritus ani, the histologic features of chronic dermatitis are seen. Histologically, there is a marked acanthosis (thickening) with elongation of the rete ridges. There are scattered areas of hyperkeratoses with areas of parakeratoses (abnormal retention of nuclei). Only slight intracellular edema may be present in the epidermis and vesicle formation is absent. In the upper corium there is a perivascular infiltration composed of a multiplicity of cells which includes lymphocytes for the most part, but the number of eosinophils, histiocytes and fibroblasts may be considerable. Neutrophils are usually absent. The number of capillaries is increased and their endothelial cells may show swelling and proliferation. Clinically this is accompanied by the itching of "dry lichenification." It has been produced experimentally anywhere in the body by ingenious "scratching machines" which results in a clinical and histologic picture of the naturally occurring condition.

Essential (Idiopathic) Pruritus Ani. On careful examination of patients with essential pruritus ani, dermatitis of the canals of the external ear (another orifice) may occasionally be found. Not infrequently, too, lichenified dermatitis, sharply circumscribed and superficial in appearance, may be noticed on the back of the neck and extending for a short distance into the hairline of the occiput. This is referred to as lichen chronicus simplex or neurodermatitis. The characteristics of essential (idiopathic) pruritus ani are as follows: (1) usually dry, fissured and lichenified; (2) may "weep" if recently eczematized; (3) occurs in tense, perfectionistic individuals and (4) is associated with irritable bowel, neurodermatitis elsewhere, otitis externa, food allergy and psychosomatic determinants.

In addition to the anal region, the areas most frequently involved in essential pruritus ani are probably the vulva in females and the scrotum in males, either by extension of the disorder or onset of the actual disease *de novo*. A simple extension of the horizon of the proctologist to areas other than the anogenital region will often help him to characterize the condition clinically.

PRURITUS

Any consideration of pruritus ani must include a discussion of pruritus. In the modern concept of itching, the dermatologist prefers to consider pruritus as an altered pain sensation. It is of interest that stimulation of cold spots in the skin will elicit the sensation of cold no matter how they are stimulated. Pain spots in the skin, however, can be stimulated by various technics to cause an itching sensation. This explains why various "non-specific" stimuli which represent different forms of energy may yield an itch response.[5] As noted in Figure 1, the density of itching points in the anogenital area of the male is markedly increased within the first 1 to 2 cm. of perianal skin. Itching is absent if the epidermis is denuded. Agents which can cause the disappearance of pain will also affect itching in the same way. When pain returns, the pruritus returns with it.[6] It has also been noted that central points of itching such as may occur in the rectum can be followed by waves of itching which extend to other parts of the body.

Scratching is a normal reflex response to the itch sensation and it is difficult to criticize a

patient for scratching. The intolerable, weak pain which we call itch is so unpleasant that the patient tries to convert it to a strong pain by the process of scratching. Itching disappears when strong pain is substituted. Strong pain often is more endurable, at least temporarily, than the unpleasant sensation of itching. Scratching damages the skin, however, and this prevents natural healing and is followed by other effects which prolong dermatitis. It may be said at this point that none of the local anesthetics or antihistaminics *per se* show any ability to penetrate when applied to the normal or injured skin, and so do not alter the pain or itch.[7,8] Moreover, fifty-four topical antipruritic preparations commonly prescribed were found to have no effect on experimentally produced histamine pruritus in man.[9] Itching may be present without any abnormality in the skin of the perianal area. The itch threshold is lower after psychic trauma and the large emotional element so induced makes these patients difficult to manage.[10]

Factors Which May Maintain Dermatitis

Pillsbury[11] has summarized the important factors which help to maintain dermatitis and which may account for the lack of improvement in these patients. It is well to remember, for example, that probably there are multiple etiologic factors which account either for the onset or the continuation of pruritus ani. Does the patient have contact dermatitis, seborrheic dermatitis or is he an atopic individual? Is he emotionally unstable, with the appearance of localized neurodermatitis either solely in the perianal area or accompanied by lesions of lichenified neurodermatitis elsewhere? Are there mycotic and bacterial elements that have altered the clinical picture? Has the dermatitis been continued because of ingested or inhaled substances in an already atopic or allergic individual? It is well to remember the axiom, "An irritant applied to an irritated tissue can result only in more irritation."

In the "factorial analysis" of an itching dermatitis[12] causal concepts are considered, such as production of epidermal sensitization during treatment, bacterial invasion of the dermatitic skin, change in the hydrogen ion concentration of the eczematous skin, mechanical blocking of sweat ducts and many other changing phenomena associated with skin irritation. A knowledge of these facts will give further insight into the difficult problem which confronts the practitioner in the management of pruritus ani. It has been my experience that patients with this disorder have "been about" and have seen men competent to deal with this entity. There must be some explanation for the chronicity and continued discomfort suffered by the patient with this disorder.

Sensitization by Topical Agents. The actual sensitization of the damaged skin is one of the most constant and persistent reasons for the continuation of pruritus ani. Sensitization dermatitis or dermatitis therapeutica is a well established disorder both from the clinical and the experimental standpoint. In recent years, however, the introduction of newer drugs for topical application has brought this fact more forcibly to our attention. The widespread use of the sulfonamides for the treatment of superficial pyogenic infections of the skin showed early in the past decade the high "sensitizing index" of this class of compounds. This was closely followed by such sensitizing preparations as penicillin, streptomycin, the "caines" and certain antihistaminics applied locally.[11] In controlled clinical studies Perry[13] and Baldridge[14] were not able to demonstrate any antipruritic or anti-inflammatory activity of several active antihistaminic ointments that could not be explained by the use of the ointment base without the addition of antihistaminics. Likewise, other clinical studies[15] showed that the efficacy of various local anesthetic agents has in no instance been proved on the basis of controlled work. It has been shown that the penetration of these agents through the unbroken skin in amounts sufficient to have any local anesthetic effect is virtually impossible. The explanation is that the skin is too effective a barrier to allow for sufficient transfer of molecules of the chemical anesthetic to dissociate from the vehicle. This differs from the response of mucous membrane in which the action of local anesthetic agents is effective, for example, in internal hemorrhoids. Transepidermal absorption of various substances including electrolytes, lipid soluble compounds, hormones, vitamins, heavy metals and their salts as well as many other substances, has been studied by various technics. It is hoped that further information regarding transport through epidermal cells may be forthcoming with the use of isotopes and

radiographic technics, histochemistry and other methods.

It is of interest that the pH of normal skin is usually on the acid side, varying from 4 to 7, chiefly being between 4.2 and 5.6. Earlier work in this field was confirmed by Blank[16] who used glass electrodes and obtained precise and reliable potentiometric measurements on the arms of normal males, females and children. In the diseased or inflamed skin, however, the hydrogen ion concentration is altered toward the alkaline side and reverts to the acid side when the inflammatory process subsides. Anderson[17] reported that the hydrogen ion concentration of the skin in atopic eczema is raised to the alkaline side. Likewise, Schmid[18] found a considerable shift of the hydrogen ion concentration of the skin surface sweat to the alkaline side in cases of eczema and seborrheic dermatitis. Patients with these disorders are subject to bacterial infection. Although fungi grow best in the laboratory in Sabouraud's medium (pH 4.9), Pereiro Miguens[19] found that monilial infections favor a pH closer to normal (pH 7).

Bacterial Flora. In this connection the role of bacteria in the continuation of chronic dermatitis is often overlooked. Pillsbury[20] has shown that the inflamed skin has reduced antibacterial powers against pathogenic organisms. This is true whether the dermatitis has an external or internal causation. Within a few days to weeks, the bacterial flora of eczematous skin changes markedly. These changes permit the growth and recovery of a coagulase positive hemolytic Staphylococcus aureus two to three times as frequently as from normal skin and recovery of a beta hemolytic streptococcus at least twice as frequently as from normal skin, including the isolation of Lancefield group A streptococcus in some 15 to 20 per cent of cases. This organism almost never is found on the normal skin other than as an occasional contaminant.

Fortunately, frank pustules, cellulitis and lymphangitis associated with chronic dermatitis are rarely seen in pruritus ani, but these pathogenic and potentially pathogenic organisms, although abiding in a harmless fashion on the skin, may be producing skin damage in a manner not yet understood. It is believed that after a period of time many individuals become sensitized to these abnormal bacteria and particularly to the staphylococcus. This sensitization or allergy to the bacteria can produce the same type of low grade inflammatory response in the skin, which is seen in the tuberculin or the Trichophyton reaction. It is similar to the reaction seen forty-eight hours following the introduction of any bacterial antigen into the skin of a sensitized individual. The demonstration of specific hypersensitivity by extracts of either autogenous or stock bacterial antigens is difficult to evaluate clinically with our present technics. Likewise, the clinical results of the use of autogenous or stock bacterial extracts in treatment is not easily measurable with any degree of scientific accuracy. Nevertheless, bacterial extracts or vaccines and other nonspecific agents (proteins-typhoid) are often useful in chronic dermatitis. Pyodermia of the skin elsewhere than in the anogenital area is readily controlled with broad spectrum antibiotics. Since pruritus of this area is frequently seen after long courses of antibiotics given for other conditions, it is unwise to use this modality for any extended time in pruritus ani. Nevertheless, the parenteral administration of the antibacterial agent is probably superior to any type of local application of these substances.

Allergy. In addition to the epidermal sensitization produced in some patients by the direct application of sensitizing drugs, certain principles of allergy apply to the management of a chronic eczematous process. The pathologic and clinical pictures and the response of the epidermis and dermis to injury are very much the same regardless of the agent involved. Even though pathogenic fungi or bacteria can be demonstrated in the area, the skin response is that of eczema. This is also true when ingested proteins, drugs, antibiotics, simple chemicals and other antigens arrive and react at the sensitized site—the end result is still eczema. Anogenital itching may be seen as a manifestation of certain other allergic responses. During the routine administration of pollen extracts a reaction may suddenly develop in the patient with hay fever soon after the injection of the offending pollen; usually there is a brief period of sneezing, conjunctivitis or rhinorrhea. If the reaction is more severe, however, urticaria and pruritus appear accompanied by severe anogenital itching. This can usually be controlled by the prompt use of epinephrine. The reasons for the localization of pruritus in this reaction are not known. A similar interesting reaction

may also be seen occasionally in the individual who is allergic to poison ivy. With routine oral desensitization using an oleoresin of poison ivy, a reaction consisting of severe pruritus ani may occur which is the first sign of the limit of tolerance of oral dosage for that particular patient. This is also true in ragweed oil oral desensitization and may explain the mechanism of production of anogenital pruritus in patients taking extended courses of antibiotics. Patients with generalized penicillin reactions complain bitterly of anogenital pruritus.

A patient in whom an allergic reaction to one preparation has already developed is more susceptible to sensitization to other preparations. Reactions to the same "family" of drugs are, of course, more readily produced; for instance, the crossed sensitivity of a patient to a group of drugs such as the "caines." But the sensitization may go much further than this. Sensitivities to unrelated substances may develop and it is said that "broadening of the allergic base" has occurred.[11] Atopic individuals (asthma, hay fever, infantile and atopic eczema) are born with the capacity for sensitization by endogenous or exogenous routes. An alarming number of anaphylactic deaths due to penicillin, for example, have occurred in this group of individuals. Penicillin reactions in non-atopic individuals, although troublesome and at times severe, are rarely fatal. Normal individuals can readily be sensitized by the external application of various substances. The percentage of positively sensitized individuals varies with the substance. Almost 70 per cent of the normal population can be sensitized with poison ivy extract. Sulfonamides, penicillin and some antihistaminics may produce sensitization as high as 10 per cent. Some patients seem to have a permanent immunity and can never be sensitized regardless of the number of exposures to a given substance. During a severe exacerbation of dermatitis, the range of contact hypersensitivity may suddenly increase. In patients of this type the application of relatively harmless local preparations may produce reactions. Some of these agents may have been used previously by the patient without any untoward reaction. Moreover, it is not an uncommon clinical finding that an area of skin so sensitized to a chemical compound, or in which secondary infection has developed, may react to ingestion of a particular food.[21] Intracutaneous or scratch tests with foods in these cases are not good criteria for investigating dermal sensitivity to foods in pruritus ani. Trial diets, food diaries and a high index of suspicion to known allergenic foods are much more practical approaches to this problem.

Sweat Retention Syndrome. As the puzzle of the continuation of chronic itching dermatitis continues to unfold, certain other investigations in the past decade are worthy of documentation. Mechanical blockage of sweat ducts as a factor in dermatitis were studied by dermatologists as a result of the diseases of sweat glands seen in miliaria during World War II in troops in the Southwest Pacific.[22–24] Following the initial studies it was demonstrated that complete loss of sweating followed a variety of minor or insignificant injuries to the skin. These included, for example, moderate exposure to ultraviolet light, patch tests with soap solution and various other agents, and application of adhesive tape or continuous wet compresses. If a patch of skin will not sweat for a period of two to four weeks after application of adhesive tape, is it any wonder that the same phenomenon will exist following an inflammatory process of the skin? In a number of common skin disorders—atopic dermatitis, contact dermatitis, fungous infections and others—this function is diminished or complete loss of sweating may exist. It is possible that obstruction of the sweat mechanism, with retention of the secretion or escape into the layer of the skin, may play a role in the maintenance of acute or chronic dermatitis. Moreover, since the sweat of some patients has been shown to be urticariogenic, the retention of this irritant-containing material can produce whealing and itching at the site.[25,26]

Psychosomatic Determinants. The constant annoyance of any eruption which is associated with pruritus is difficult enough for the patient to tolerate; there seems to be something especially annoying about anogenital pruritus. Much has been written about the psychosomatic influence upon this disorder. In many instances it is difficult to tell which is the cart and which the horse, although, in my opinion, these influences are contributory and never causal. Some deny the nervous influence on the disease; others believe that none but the psychiatrist should manage anogenital itching. The experience of different authors will depend on the type of material seen. Anxiety and tension play an important role in the continua-

tion of the scratch-itch-scratch cycle in our patients who have had excellent management for pruritus ani before coming to the Lahey Clinic. These comprise the bulk of patients with so-called essential pruritus ani. In most of these patients it is possible in several interviews to allow them to "ventilate" openly. Although time-consuming, it is important to discover early in the course whether expert psychiatric help will be necessary. Furthermore, it is necessary to establish good contact with the patient when the need for this type of consultation arises. Positive reassurance and a kindly attitude help most patients who have a situational-emotional problem. Others who show more serious psychosomatic determinants associated with pruritus ani are best left to the expert guidance of a psychiatrist who has some familiarity with skin problems.

TREATMENT

The ultimate goal of therapy is removal of the cause of itching.[27] The numerous causes mentioned in the introductory portion of this paper should be searched for and eliminated. Freed from all extraneous encumbrances, the objectives of therapy in pruritus ani can be listed under three headings: (1) relieve itching; (2) accelerate healing, and (3) allow natural healing without trauma due to physical, chemical, allergic or microbiologic agents.

In discussing possible mechanisms for the relief of itching, the first consideration could be the removal of the stimulus. Blank[28] believes that the best treatment for the relief of a symptom is the removal of the factor or factors that cause that symptom. This is seldom possible when one attempts to relieve itching. It is rare that the stimulus is known. The patient who itches after wearing a wool sweater or dermatitis which develops after a baby wears a new woolen snow suit is easily managed by removing the offending agent, which is fairly easily recognized. When itching results from bites of parasites, the stimulus is removed indirectly by ridding the patient of parasites. One can only speculate that perhaps histamine release may be the cause of the pruritus. It is not relieved by local application of antihistaminic preparations.

Also, the sensory reception, transmission or perception of the stimulus could be altered by either peripheral or central attack on the problem. This introduces, again, the subject of the use of local anesthetics, general anesthetics and sedatives. If local anesthetics applied to the intact skin are to function, enough of the anesthetic agent must penetrate the skin to the sensory nerve endings to alter their ability to receive or transmit the stimulus. As previously mentioned, it is doubtful whether local anesthetics can penetrate intact skin very rapidly. They will penetrate broken skin or mucous membranes more rapidly. Again, like antihistaminics, they have a high index of sensitization and this would allergically traumatize the skin.

Actually our greatest success in the peripheral control of itching is obtained by substitution of another stimulus. This is what happens when the patient scratches and excoriates the perianal area. He simply substitutes a pain stimulus which is more tolerable than the pruritus. Another substitution phenomenon is the local application and action of the wet dressing and lotions. These alter the temperature of the skin and this substitutes the sensation of heat or cold for the itch sensations and, temporarily at least, relieves the itching. The temperature of the application is very important. As a rule, even a small elevation in temperature may aggravate pruritus; for example, a patient's itching may increase when he enters a warm room. A very hot dressing may temporarily increase itching but subsequently relieve it. If the dressing is hot enough to be painful, this also is a substitution of pain for itching. A decrease in the temperature of the cutaneous surface usually relieves itching and much of the external therapy of the skin is directed toward cooling the cutaneous surface.

Wet Dressings. The rate at which heat from the skin is lost to the wet application will depend on four properties of the wet dressing: (1) the liquid used, (2) the temperature of the liquid, (3) the amount of liquid per unit area of skin, and (4) the rate of evaporation from the surface of the liquid. Water is probably the most commonly used liquid for the wet dressing and the most efficient because it has the highest heat capacity of any liquid, according to Blank.[28] When the two methods—the closed compress of water and soaking in a tub—are compared, the major difference is the amount of water used per unit area of skin. In general, since there is considerable water in a soak, the skin will be cooled satisfactorily. However, one must consider that heat can be

removed by evaporation of the water in addition to the physical properties of the water itself, so that an open wet compress left uncovered is actually an efficient method for cooling the anorectal area.

There is no evidence that adding boric crystals, potassium permanganate, sodium chloride or Burow's solution to the water either aids or accelerates the rate of healing of the lesions. There is no evidence that these substances in themselves are specifically antipruritic. An oozing lesion is said to "dry" faster with the addition of potassium permanganate, 1 to 8,000 in water. Notwithstanding these scientific facts, the art of medicine often requires the "coloring" of the waters. A wet compress may traumatize the perianal area if it is applied too frequently and for too long a period without allowing the cornified epithelium to dry out between dressings. Maceration is the absorption of water by the cornified epithelium, resulting in hydration and swelling. The amount of water which cornified epithelium will hold is a function of its hydrogen ion concentration. Since water has no buffer capacity, it is not likely to alter the hydrogen ion concentration of the cutaneous surface. It is true that the addition of most salts alters the maceration of the cornified epithelium very little. Boric acid and potassium permanganate are poor germicides but both may function as bacteriostatic agents. They are, however, applied for such brief periods of time that they cannot be relied upon entirely for bactericidal or bacteriostatic properties. At the Massachusetts General Hospital the dermatologic service has used plain water for wet dressings, soaks and baths for over four years and the results have been equal to those obtained previously when various substances were added to the water.

Lotions. In regard to lotions, the cooling effect from simple calamine lotion is very short-lived. The amount of evaporation from the residual surface powder that remains is not significant. Lotions are not bactericidal and it is doubtful that they promote epithelization. Most of the contents of a lotion are chemically inert. If lotions are to be used, the best carrier is alcohol which will cool the skin even better than water. In addition, cooling can be obtained in another way. Some drugs apparently function on the sensory nerve endings to produce a sensation of cooling. Menthol and related substances can be added to lotions. Based on these principles, an effective lotion is as follows: menthol 0.1 to 0.2, hexachlorophenol 0.1, glycerol 10.0 to 14.0, isopropyl alcohol (99 per cent) 20 to 30 cc., water (distilled) q.s. ad 100 cc.*

This lotion can be used on subacute and chronic dermatoses. It can be used after the first day or two of wet dressings for acutely inflamed pruritus ani. If fissures are present, some stinging and smarting may accompany the use of the lotion because of the presence of alcohol and glycerol. If the patient is advised about this, there will be no objection. Since phenol is a toxic agent its use locally should be carefully controlled.

Ointments. In addition to soaks, compresses and lotions which have an antipruritic effect because of their cooling properties, ointments recommended for pruritus ani have been legion. Aside from empiric usage, however, their effectiveness if present in individual cases is hard to explain. Ointments, when used in this condition, should be limited to one of several actions: (1) antibacterial agents, (2) antifungicidal agents, (3) protective, or (4) anti-inflammatory action.

Any of the antibiotic preparations are effective if it is remembered that some are more sensitizing than others. Neomycin, in the form of an ointment or used as a spray (if the ointment is not well tolerated), is a useful agent. A wide range of antifungicidal agents is available, most of which incorporate the fatty acids. Occasionally one must return to the older antifungicidal agents such as modified Whitfield's ointment or modified Castellani's paint. Many of these antifungicidal agents are mildly bacteriostatic as well.

Not infrequently, a simple protective or emollient ointment is all that is needed to supplement wet dressings. Petrolatum or a hydrated petrolatum will protect the skin, prevent excessive evaporation of moisture, keep the cutaneous surface soft and pliable, and prevent cracking and fissuring.

Corticosteroids. Probably the greatest advance in the management of some of these patients, especially those with the dry, lichenified form of essential pruritus ani, is the use of hydrocortisone ointment.[29] Hydrocortisone may be combined with antibiotics and in some instances may be more effective than simply hydrocortisone alone.[3,30] The newer fluoro-

* Modified from Frazier and Blank.[28]

cortisone preparations also are effective in much smaller dosage. The action of the corticosteroids in the relief of pruritus ani is not known, but is probably on the basis of its anti-inflammatory action.

The free alcohol hydrocortisone preparations are more effective than the acetate. If a patient has had a ten-year history of pruritus ani and is relieved in two weeks by local and general measures, it is wise to continue the use of hydrocortisone locally for six to eight weeks. Gradual discontinuation is advisable to prevent the "rebound" or recurrences seen on sudden withdrawal of the preparation. If the patient is not relieved appreciably in forty-eight hours with topical steroid therapy, it is usually necessary to change to another brand or form of the steroid. It is not unusual, however, to find that patients become resistant to the continued applications of the corticosteroids locally, and recourse to the older proven therapeutic aids is then in order. This is especially true in the use of superficial x-ray therapy. This modality, which in the past often was the treatment of choice, is now reserved for patients who do not respond to topical measures.

In connection with the hydrocortisone type of therapy, Turell emphasized that "the continual topical application of any medicament to the anogenital area, or erogenous zone, carries the often unrecognized risk of perpetuating or even increasing the severity of the pruritus."[31] He further believes that the topical application of hydrocortisone preparations is being abused by its promiscuous use, often without a proper examination. This constructive criticism applies, of course, to all local applications.

Systemic Treatment. The systemic treatment of pruritus ani, aside from psychiatric management, had not been emphasized until it was shown by Fromer and Cormia[32] that severe anogenital pruritus could be controlled by the systemic administration of ACTH. In a number of patients severe intractable disease has been adequately controlled since 1952 when this measure was introduced. An additional series was reported later[33] with the same follow-up results in the majority of patients. Subsequently, this method of treatment was given wider support by Turell.[2] Patients who formerly required tatooing, clover leaf or undercutting operations, or injections of various preparations including alcohol and long-acting local anesthetics could be treated in the hospital for four to seven days using ACTH intravenously in diminishing dosages and then maintained at home with ACTH gel for two to three weeks. Once the cycle of itching was adequately interrupted, healing of the anogenital tissues could go forward without the incessant scratching of the patient. Patients not relieved by the topical administration of the corticosteroids can still be treated with this method.

The section on proctology at the Lahey Clinic has largely discontinued the surgical measures so often used in the past. In our experience the undercutting operations, alcohol injection and other measures have had an exceedingly temporary effect in a majority of patients and the recurrence rate is so high that these measures, in our opinion, are contraindicated. This high percentage of recurrence in the treatment of pruritus ani can best be explained by the recent work of Lobitz in studies of epidermal regeneration or wound healing.[34,35] He has shown that experimental scratching or excoriation of the skin, which leads to mild injury without denuding the skin, is followed by a degenerative change of the epidermal cells in four hours. Regeneration begins about four hours after this and is complete in seventy-two hours. Lobitz then found that the epidermis is twice as thick as previously and begins to take on the appearance of the lichenoid skin seen in essential pruritus ani. If the skin is traumatized by cellophane strip or a burr, the time sequence of regeneration goes on as mentioned but two months or longer may be required for complete regeneration or wound healing. He has found, further, by the use of serial sections and a special stain, that there is obstruction of the sweat pores followed by "dry skin" itching; and if the skin is denuded by scratching, sebaceous elements may be found on the surface of the new epidermis leading to epithelial inclusion cysts and foreign body granulomas. Finally, it is of further interest that if, with a special technic, only the dermis is damaged, such as would happen with injections of alcohol or of long-acting anesthetics, the epidermis still responds as if it were primarily damaged, leading to thickening of the epidermis and itching lichenification. The same mechanism explains the failures seen after local hydrocortisone injections. These not only failed to relieve but also were followed by increased lichenification

and pruritus. This again would seem to bear out the thesis that one must avoid trauma in any form including local injections of various substances.

Other General Measures. The occurrence of pruritus ani in patients with a personal or familial background of allergy requires the use of elimination diets in at least a fair percentage of these patients. This is not a theoretic consideration, since many patients with this disorder are also investigated in the Department of Gastroenterology. A coexisting diagnosis of irritable bowel or gastrointestinal allergy, or both, with pruritus ani is often made. The institution of dietary changes, antispasmodics and good hygiene of living suffices to manage the gastrointestinal symptoms as well as the anal pruritus. Often these patients are hospitalized and this presents a splendid opportunity to teach them anal hygiene, the careful use of wet dressing and local applications, and the avoidance of toilet paper. Since many patients complain bitterly of nocturnal itching and scratching, chloral hydrate in sufficient dosage to produce sound sleep is the best sedative. According to Lobitz,[27] sodium salicylate and chloral hydrate often constitute the best combination of sedation and antipruritic form of central control of itching. In some patients the use of the newer "tranquilizers," chlorpromazine and the Rauwolfia derivatives, is indicated. While the patient is hospitalized, psychosomatic factors may also be evaluated and the aid of a practical psychiatrist enlisted if necessary. Very few patients, in my opinion, will require long analytic treatment. Most patients have a superficial problem, situational in type, which can often be managed by the non-psychiatrist.[10] During hospitalization all the etiologic factors of this disease can be appreciated, evaluated and then properly treated.

COMMENTS

A review of the recent literature on pruritus ani indicates a sincere attempt on the part of investigators and clinicians to approach this subject from a rational standpoint. Lynch[36] discussed cutaneous infection in pruritus, the sensitizing properties of the "caines" and other sensitizing agents such as contraceptive preparations, hygienic pads, deodorants and toilet waters. He suggested the use of bacitracin ointment or neomycin ointment and has found vioform® ointment effective when secondary infection exists in the eczematized skin. Jackman[37] discussed the causes of pruritus ani under the following: Systemic causes (5 per cent), which include obesity, jaundice, diabetes and allergy. Local surgical causes (25 per cent), which include hemorrhoids, ectropion of mucosa or mucosal polyps, perineal drainage, sinuses, anal fissures, scarring, stenosis and cryptitis. The non-surgical local causes are condyloma acuminatum, psoriasis, seborrheic dermatitis, pinworms, fungus, dermatitis venenata and antibiotic therapy. He believed pruritus ani was psychogenic in origin in the remainder of the patients; this comprised 70 per cent of his material. Mann[38] stressed the need of a bland diet and removal of foods of highly allergenic sensitizing properties. The importance of maintaining good anal hygiene and the rationale of the use of local preparations in pruritus ani are very well reported by Kallet and Davlin.[39]

The use of corticotropin and cortisone in intractable anogenital pruritus was presented by Turell.[31] He believed that the use of these agents presented a significant advance in the management of these patients. Herfort[40] gave cortisone by mouth to patients with pruritus ani, using 300 mg. daily and rapidly reducing the amount to a maintenance dose of 50 mg. daily. Brooke emphasized that the histologic picture of pruritus ani is similar to that seen in allergic skin lesions.[41] He achieved excellent results with his method of internal administration of cortisone although he had a small series of cases. Alexander and Manheim[42] reported twenty-nine patients treated with a local application of 2.5 per cent hydrocortisone acetate ointment. Twenty-six of twenty-nine obtained relief.

The entire subject of the relationship of anogenital pruritus as a common dermal reaction to antibiotics is discussed by Rees.[43] Kligman[44] reviewed the entire subject from the standpoint of a dermatologist and mycologist. This author, as well as Moore[45] and Woods, Manning and Patterson,[46] also noted the effect of the production of anogenital pruritus and its connection with a secondary monilial involvement in the anogenital area. The addition of antifungicidal agents to some of the oral and injectable preparations of the various antibiotics is proof of the concern over this problem by clinicians and drug manufacturers alike. Warin discussed antihistamine therapy with

special reference to skin disorders, and concluded that this class of preparations is only of value in urticaria and has no value in other dermatologic disorders.[47] Furthermore, in an editorial discussion in the *British Medical Journal* mention is made of the action of the American Council on Pharmacy and Chemistry as "acting upon the opinion of experienced dermatologists—has recently agreed to discontinue the acceptance of dermatological preparations of all antihistamine drugs and to omit from 'New and Nonofficial Remedies' all currently accepted products in that category."[48]

MacAlpine[49] studied sixty-four patients with pruritus ani from the standpoint of psychosomatic determinants. He suggested that this symptom in some patients represents a psychopathologic state pointing to a hypochondriacal syndrome which is capable of reduction by psychotherapy. Berezin[50] discussed a case report of anogenital pruritus and suggested that the psychodynamic structure is based on the hysterical symptomatology. Calnan and O'Neill's work[51] is a sensible psychosomatic approach to this problem which points out that depression, fatigue, irritability, indigestion and a poor total response to stress are noted in some patients with pruritus ani. These symptoms, which are often overlooked by the busy practitioner, may explain the poor response to treatment in dealing with a patient who is frustrated, resentful and has inborn smoldering anger against some situational conflict.

Finally, in recent experimental production of itching by local use of histamine, Cormia has shown that the itch threshold, while variable from patient to patient, was usually constant in a given individual when determined under uniform circumstances; the itch threshold was greatly lowered at night and was lowered in involved more than in uninvolved skin, regardless of demonstrable lesions. In addition, the itch threshold was lowered after psychic trauma.

The physician who undertakes to manage pruritus ani is treating eczema or dermatitis. Since this condition follows the laws of dermatitis elsewhere on the body, it follows that the general practitioner, proctologist, gynecologist or dermatologist who understands the pathologic physiology of eczema may have less difficulty in the management of pruritus ani. It is far better to classify the disorder, search for the etiology and consider the stage of the dermatitis. To use one's favorite topical application at the moment blindly, without regard to fundamentals, is tantamount to adding insult to injury.

SUMMARY AND CONCLUSIONS

1. A physiologic approach to the problem of pruritus ani has been presented.

2. Various factors combine to maintain dermatitis with its attendant pruritus. These factors include allergic sensitization of the skin by preparations with a high "sensitization index," change in the pH of the eczematous skin, sweat retention phenomena, bacterial and mycotic invasion, and psychosomatic influences.

3. Pruritus ani associated with various surgical, medical or dermatologic problems is best managed by treatment of the primary condition. This leaves a significant group of patients with idiopathic or essential pruritus ani for whom treatment suggestions have been outlined. This group responds best to the intelligent use of local dermatologic measures in addition to general systemic treatment which involves the consideration of emotional and allergic factors as well.

REFERENCES

1. Swinton, N. W. Pruritus ani. *New England J. Med.*, 236: 169–172, 1947.
2. Turell, R. Corticotropin and cortisone in intractable anogenital pruritus. *J. A. M. A.*, 152: 806–808, 1953.
3. Becker, G. L. Recent advances in the local treatment of perianal skin lesion. *Am. J. Surg.*, 88: 289–292, 1954.
4. Lever, W. F. Histopathology of the Skin, p. 56. Philadelphia, 1949. J. B. Lippincott Co.
5. Rothman, S. Physiology of itching. *Physiol. Rev.*, 21: 357–381, 1941.
6. Lobitz, W. C., Jr. Some physiologic aspects of dermatologic problems. *New England J. Med.*, 251: 545–550, 1954.
7. Hardy, J. D., Potelunas, C. B. and Meixner, M. D. Measurement of pain threshold and superficial hyperalgesia in diseases of the skin. *J. Invest. Dermat.*, 12: 307–316, 1949.
8. Hardy, J. D., Potelunas, C. B. and Meixner, M. D. Pain threshold measurements of human skin following application of topical analgesics. *J. Invest. Dermat.*, 16: 369–377, 1951.
9. Shelley, W. B. and Melton, F. M. Relative effect of local anesthetics on experimental histamine pruritus in man. *J. Invest. Dermat.*, 15: 299–300, 1950.
10. Schindler, J. A. The treatment of emotionally induced illness in general medical practice by an audiovisual technic. *Ann. Int. Med.*, 42: 909–920, 1955.

11. Pillsbury, D. M. Physiologic principles in management of dermatitis. *New England J. Med.*, 244: 423–429, 1951.
12. Stokes, J. H. Changing causal concepts and investigative methods. *J. Invest. Dermat.*, 3: 257–271, 1940.
13. Perry, D. J. Local use of benadryl ointment. *J. Invest. Dermat.*, 9: 95–97, 1947.
14. Baldridge, D. G. Controlled clinical evaluation of relief of pruritus by thephorin ointment. *Arch. Dermat. & Syph.*, 63: 260–261, 1951.
15. Melton, F. M. and Shelley, W. B. Effect of topical antipruritic therapy on experimentally induced pruritus in man. *J. Invest. Dermat.*, 15: 325–332, 1950.
16. Blank, I. H. Measurement of pH of the skin surface. I. Technique. *J. Invest. Dermat.*, 2: 67–74, 1939.
17. Anderson, D. S. The acid-base balance of the skin. *Brit. J. Dermat.*, 63: 283–296, 1951.
18. Schmid, M. Vergleichende Untersuchungen über die Säure-Basen-Verhaltnisse auf der Haut. *Dermatologica*, 104: 367–391, 1952.
19. Pereiro Miguens, M. El pH y la flora de los pequeños pliegues. *Actas dermo-sif.*, 41: 607–632, 1950. Cited in: *Excerpta med.* (Sec. XIII), 5: 6, 1951.
20. Pillsbury, D. M. Management of bacterial infections of skin. *J. A. M. A.*, 132: 692–698, 1946.
21. Livingood, C. S. and Pillsbury, D. M. Specific sensitivity to foods as factor in various types of eczematous dermatitis. *Arch. Dermat. & Syph.*, 60: 1090–1115, 1949.
22. Sulzberger, M. B., Zimmerman, H. M. and Emerson, K., Jr. Studies on prickly heat. III. Tropical anidrotic asthenia (thermogenic anidrosis) and its relationship to prickly heat. *J. Invest. Dermat.*, 7: 153–164, 1946.
23. O'Brien, J. P. Study of miliaria rubra, tropical anhidrosis and anhidrotic asthenia. *Brit. J. Dermat.*, 59: 125–158, 1947.
24. (*a*) Shelley, W. B. and Horvath, P. N. Experimental miliaria in man; production of miliaria rubra (prickly heat). *J. Invest. Dermat.*, 14: 193–204, 1950; (*b*) Shelley, W. B., Weidman, F. D. and Pillsbury, D. M. Experimental miliaria in man; production of sweat retention anidrosis and vesicles by means of iontophoresis. *J. Invest. Dermat.* 11: 275–291, 1948.
25. Sulzberger, M. B., Harrmann, F., Borota, A. and Strauss, M. B. Studies of sweating. VI. On the urticariogenic properties of human sweat. *J. Invest. Dermat.*, 21: 293–303, 1953.
26. Cormia, F. E. and Kuykendall, V. Studies on sweat retention in various dermatoses. *Arch. Dermat. & Syph.*, 71: 425–435, 1955.
27. Lobitz, W. C., Jr. and Jillson, O. F. Symposium on dermatology; physiologic approach to management of itching. *Postgrad. Med.*, 12: 2–9, 1952.
28. Frazier, C. N. and Blank, I. H. A Formulary for External Therapy of the Skin, p. 71. Springfield, Illinois, 1954. Charles C Thomas.
29. Sulzberger, M. B., Witten, V. H. and Smith, C. C. Hydrocortisone: (compound F) acetate ointment and dermatological therapy. *J. A. M. A.*, 151: 468–472, 1953.
30. Kile, R. L. The use of hydrocortisone-neomycin ointment. *Obio State M. J.*, 49: 1097–1098, 1953.
31. Turell, R. Hydrocortisone therapy in the control of anogenital pruritus. *J. A. M. A.*, 158: 173–175, 1955.
32. Fromer, J. L. and Cormia, F. Adrenocorticotrophic hormone in severe anogenital pruritus. *J. Invest. Dermat.*, 18: 1–2, 1952.
33. Fromer, J. L. and Smith, A. T. The use of ACTH in ten patients with severe anogenital pruritus. *Labey Clin. Bull.*, 7: 232–238, 1952.
34. Lobitz, W. C., Jr., Holyoke, J. B. and Montagna, W. Responses of the human eccrine sweat duct to controlled injury. *J. Invest. Dermat.*, 23: 329–344, 1954.
35. Lobitz, W. C., Jr. and Holyoke, J. B. The histochemical response of the human epidermis to controlled injury; glycogen. *J. Invest. Dermat.*, 22: 189–198, 1954.
36. Lynch, F. W. Dermatologic views of anorectal pruritus. *Nebraska M. J.*, 39: 210–212, 1954.
37. Jackman, R. J. Management of anal pruritus. *GP*, 9: 61–66, 1954.
38. Mann, L. S. The clinical management of pruritus ani. *J. Internat. Coll. Surgeons*, 19: 505–507, 1953.
39. Kallet, H. I. and Davlin, L. P. Use of an antiseptic synthetic detergent for local hygiene in pruritus ani. *J. Michigan M. Soc.*, 51: 1447–1448, 1952.
40. Herfort, R. A. Cortisone in the treatment of pruritus ani. *New York State J. Med.*, 53: 2871–2872, 1953.
41. Brooke, B. R. Perineal pruritus an allergic manifestation? *Northwest Med.*, 38: 462–464, 1939.
42. Alexander, R. M. and Manheim, S. D. The effect of hydrocortisone acetate ointment on pruritus ani. *J. Invest. Dermat.*, 21: 223–225, 1953.
43. Rees, R. B. Anogenital moniliasis. *California Med.*, 80: 95–97, 1954.
44. Kligman, A. M. Are fungus infections increasing as result of antibiotic therapy? *J. A. M. A.*, 149: 979–983, 1952.
45. Moore, M. In vivo and in vitro effect of aureomycin hydrochloride on syringospora (monilia, candida) albicans. *J. Lab. & Clin. Med.*, 37: 703–712, 1951.
46. Woods, J. W., Manning, I. H., Jr. and Patterson, C. N. Monilial infections complicating therapeutic use of antibiotics. *J. A. M. A.*, 145: 207–211, 1951.
47. Warin, R. P. Antihistamine therapy: with special reference to skin disorders. *Brit. M. J.*, 1: 1066–1069, 1954.
48. Editorial: Antihistamine drugs in dermatology. *Brit. M. J.*, 1: 1084–1085, 1954.
49. MacAlpine, I. Pruritus ani; a psychiatric study. *Psychosom. Med.*, 15: 499–508, 1953.
50. Berezin, M. A. Dynamic factors in pruritus ani: case report. *Psychoanalyt. Rev.*, 41: 160–172, 1954.
51. Calnan, C. D. and O'Neill, D. Itching in tension states. *Brit. J. Dermat.*, 64: 274–280, 1952.

Management of Primary Carcinoma of the Rectum Diagnosed during Pregnancy

D. W. McLean, M.D. (*By Invitation*), T. C. Arminski, M.D. (*By Invitation*) and G. T. Bradley, M.D., *Detroit, Michigan*

When carcinoma of the rectum or rectosigmoid is diagnosed in a pregnant woman many special problems relative to the management of the pregnancy and the carcinoma must be considered. The solution of these problems will depend upon the stage of the pregnancy during which the lesion is found, the desires of the patient and her husband for a child, the judgment of the surgeon regarding the resectability and curability of the lesion, and the recommendation of the obstetrician as to how best to protect the fetus and obtain a living child. Previous authors have outlined the management of this condition. Some of these principles are still applicable; however, with the advancements made in surgery and obstetrics some must be revised.

This discussion is limited to carcinoma of the rectum and rectosigmoid because it is in the crowded pelvis that unique problems of judgment and technic present themselves.

Lever[1] is usually given credit for having reported in 1843 the first case of carcinoma of the rectum in a woman at term. However, Cruveilhier[2] should be accorded priority. In his book "Anatomie Pathologique du Corps Humaine" published in the years 1835 to 1842, he reported the case of a thirty year old woman with a clinical diagnosis of carcinoma of the rectum. He did not know that she was pregnant and did not see her again until labor had begun. A stillborn fetus was delivered by breech extraction and the patient died. Autopsy revealed typical colloid carcinoma of the rectum.

A review of the literature revealed no agreed opinion as to the management of this condition and considerable misinformation relative to the material presented in the discussion of this topic. Under the general heading of carcinoma of the rectum diagnosed during pregnancy, ninety-five different cases have been cited by various authors. Reviewing the original reports whenever possible, we found that sixty-two of these cases represented carcinoma of the rectum or rectosigmoid diagnosed during pregnancy; to these we are adding four new cases.

Sixty-two cases from the literature are tabulated in Tables I, II and III according to the trimester of pregnancy in which they were diagnosed.

Several cases do not entirely conform to this general classification and require a word of explanation as to why they were included. In 1895 Duncan[3] cited the case of a twenty-six year old woman who one year previously had had colostomy for inoperable carcinoma of the rectum. She was first seen by the author between the fifth and sixth months of pregnancy. He delivered a living child by cesarean section at eight months. The mother survived the operation and no further information was presented. This case is included (even though it was diagnosed prior to pregnancy) because the presence of carcinoma throughout the pregnancy presents the same problems as any inoperable carcinoma in this region diagnosed during pregnancy. Frank[4] (cited by Nijhoff[5]) observed a twenty-four year old woman during her seventh month. She had had previous resection for carcinoma of the rectum, and when seen had a recurrence near the perineal stoma. While this case represents a secondary lesion, it poses the same problems as a primary one. A cesarean section was performed after the eighth month, resulting in a living child. The mother died within six months. Evers described his case[6] as malignant disease of the sigmoid colon, even though the tumor could be felt on rectal examination. Thus, from his description and illustrations this lesion probably was located in the rectosigmoid or upper rectum. Case 17 of Hochenegg[7] (described by Katz and Kaspar[8]) was of a forty-two year old woman with polyposis. After her eighth pregnancy carcinoma of the lower sigmoid colon

was found and resected by the Hochenegg pull-through method. Eight years later right colectomy was performed for carcinoma of the cecum. Three years after this, during the eighth month of her eleventh pregnancy, stenosing carcinoma was found 8 cm. above the surgically formed anus in the sigmoid previously brought down. Because of the topographic location of this lesion, we have included the case. Case 18 by the same authors was also included. A carcinoma was discovered 4 cm. above the anus, and it was stated that the patient's last menstrual period had occurred one week previously. The lesion was resected and as the pregnancy progressed evidence of recurrence was noted at the operative site. Colostomy was performed and the patient died seven months after the original operation. No definite mention was made regarding the progress of the pregnancy.

Those cases diagnosed in the postpartum period present no unique problems of management attributable to a coexisting pregnancy and consequently have been excluded from this discussion. Included in this group are three cases of Bacon and Rowe,[9] one case of Fournier[10] and Kjelberg,[11] respectively, and nine cases described by Katz and Kaspar.[8] Peritonitis developed in Fournier's patient on the third postpartum day.[10] At exploratory operation carcinoma of the sigmoid was found. The patient died following this procedure. Kjelberg's second case[11] was a forty year old para VII who had had a normal pregnancy and delivery. Six weeks later an inoperable carcinoma was discovered at 6 cm. Koch[12] reported the case of a twenty-five year old para I who had bleeding, diarrhea and constipation during her pregnancy. Three months after an uneventful delivery the lesion of the rectum was diagnosed.

The first eight cases presented by Katz and Kaspar[8] were excluded because, although symptoms were present during the pregnancy, none were diagnosed. Six of these occurred after full term pregnancies and two after mis-

TABLE I

CASES OF PRIMARY CARCINOMA OF THE RECTUM AND RECTOSIGMOID DIAGNOSED DURING THE FIRST TRIMESTER

No.	Author	Year Published	Age (yr.)	Stage of Pregnancy	Treatment of Pregnancy	Treatment of Mother	Results		Location of Lesion
							Child	Mother	
1	Rosner[35]	1917	..	2 mo.	Porro section at 6 mo.	Hochenegg pull-through at 2 mo.	Not alive	Survived	Rectum, above anus
2	Maunsell[36]	1925	38	3 mo.	Delivery from below at 7½ mo.	Abdominoperineal resection at 3 mo.	Living	Living	Rectum, at level of cervix
3	Katz and Kasper[8] (Case 10)	1926	29	3 mo.	Delivery at term by version and extraction	Colostomy and posterior resection at 3 mo.	Living	Living, had recurrence	Rectum
4	Katz and Kaspar[8] (Case 11)	1926	29	3 mo.	Not stated	Trans-sacral resection at 3 mo.	Not stated	Living	Rectum at 8 cm.
5	Katz and Kaspar[8] (Case 12)	1926	38	3 mo.	Interrupted at 7 mo.	Segmental resection at 3 mo.	Not stated	Living, posterior wall broke down	Rectum at 10 cm.
6	Katz and Kaspar[8] (Case 18)	1926	26	1 mo.	None	Kraske resection at 1 mo.	Not stated	Died 7 mo. postoperatively	Rectum at 4 cm.
7	Katz[37] (Case 1)	1930	34	2 mo.	Porro section at term	Hochenegg pull-through at 13 wk.	Living	Died 3 mo. postpartum from recurrence	Rectum, extending into vagina
8	Bacon and Rowe[9] (Case 1)	1947	34	2 to 3 mo	Aborted fourteenth postoperative day	Abdominoperineal proctosigmoidectomy at 3 mo.	Aborted	Living	Rectum at 7 cm.

carriages. In Case VII the physician accomplishing the delivery had considerable difficulty which he attributed to a rectal tumor; however, no diagnosis of carcinoma of the rectum was made until this patient was seen in the postpartum period at the Hochenegg Clinic. In Case XVI described by Katz and Kaspar[8] rectal bleeding developed during pregnancy. Following delivery carcinoma of the rectum was found and resected. During another pregnancy seven years later intestinal colic developed and the patient aborted during the fifth week. Three months later carcinoma of the ascending colon was found and resected.

TABLE II

CASES OF PRIMARY CARCINOMA OF THE RECTUM AND RECTOSIGMOID DIAGNOSED DURING THE SECOND TRIMESTER

No.	Author	Year Published	Age (yr.)	Stage of Pregnancy	Treatment of Pregnancy	Treatment of Mother	Results		Location of Lesion and Remarks
							Child	Mother	
9	Potter[38]	1878	29	5 mo.	Induction and breech delivery at 7½ mo.	Colostomy 2 to 3 weeks postpartum	Living	Expired 7 days postoperatively	Rectum, extending into vagina
10	Duncan[3]	1895	26	5 to 6 mo.	Cesarean section at 8 mo.	None	Living	Living	Colostomy performed for carcinoma of rectum 1 yr. previously
11	MacVie[39]	1899	35	6 mo.	Labor induced at 8 mo.	None	Died at 5 wk. from enteritis	Living	Inoperable lesion of rectum
12	Kürstiener[40] (Breslau)	1900	29	6 mo.	Spontaneous premature delivery	None	Died at birth	Died 2 days postpartum	Carcinoma of rectum and ovary
13	Petersen[41]	1900	24	6 mo.	Aborted fourth postoperative day	Trans-sacral resection at 6 mo.	Aborted	Died on fifth day from peritonitis	Rectum at 5 cm.
14	Kjelberg[11] (Case 1)	1905	29	4 mo.	Spontaneous delivery at term	Resection at 4 mo.	Living	Died at 5 mo. from recurrence	Rectum at 10 cm.
15	Kynoch[42]	1908	21	6 mo.	Delivery from below at 7 mo.	None	Stillborn	Died 2 wk. postpartum	Lower rectum
16	Maunsell[36] (Case 2)	1925	27	3 to 4 mo.	Delivery from below	Colostomy at 3 to 4 mo., then transsacral resection	Living	Not stated	Rectum
17	Katz and Kaspar[8] (Case 15)	1926	35	4 mo.	Not stated	Sacral resection at 4 mo.	Not stated	Living	Rectal ampulla
18	Mayo and Hunt[24]	1941	42	4½ mo.	Cesarean section at 38 wk.	Subsacral resection at 4½ mo.	Living	Living	Rectum 8 cm.
19	Banner et al.[22] (Case 4)	1945	30	5 mo.	Porro section at term	Colostomy at 5 mo.; then posterior resection	Living	Living	Rectum
20	Sadugor[43]	1949	34	5 mo.	Porro section at term	Colostomy and x-ray treatment	Living	Living	Rectum at 5 cm.
21	Jennings[33]	1952	22	3½ mo.	Cesarean section at term	Abdominoperineal resection at 3½ mo.	Living	Died 3 wk. postpartum from metastases	Rectum at 7 cm.; also carcinoma of breast resected during pregnancy

We have also excluded cases of malignancy of the ovary secondarily involving the rectum These were reported by Maygrier,[13] Lotheisen[14] and LeGac.[15] The first two were already ex-

cluded by Bacon and Rowe.[9] Eliminated also were those cases of carcinoma of the colon proximal to the rectosigmoid and a case of carcinoma of the ileum. These included the reports of Fairbairn,[16] Mengert,[17] Micale,[18] two cases of DerBrucke,[19] Finn and Lord,[20] Putzki et al.[21] and a case of Banner et al.[22] The only exceptions in this group were Case XVII cited by Katz and Kaspar[8] and Evers' case.[6] The reasons for not excluding these two cases have been previously presented. Further, we have not included Case VI of Banner et al.[22] which represented a malignant polyp that was removed locally through the sigmoidoscope, and their three cases of carcinoids of the appendix. Cases V and VII of Banner et al.[22] represented pregnancies four years after resection for carcinoma, and are excluded from this discussion. Pommerenke[23] presented a single case, not two cases as has been erroneously cited several times. His patient went through two pregnancies, the first at one year and the second four years following abdominoperineal resection. Finally, Case III of Banner et al.[22] appears to be the same case previously reported by Mayo[24] in 1941; and Case IV by the same authors apparently is a case cited by Mussey and Crane[25] in 1927. The three cases cited by Gilchrist and David[71] were omitted since insufficient data were presented to classify them properly.

Since it was first described, the management of coexisting carcinoma of the rectum and pregnancy through the years closely parallels the evolution of methods perfected in the fields of surgery and obstetrics. While cesarean sections were already reported in the early writings of the Greeks, Romans and others, it was not until 1876 that Porro[26] suggested cesarean operation combined with supravaginal hysterectomy to prevent hemorrhage and infection. In 1882 Sänger[27] described the conservative cesarean section placing it on a safer basis. Thus, already in 1878 Hicks[28] and in 1879 Kaltenbach[29] were the first to report cesarean sections in patients with carcinoma of the rectum. Both patients died in the early postpartum period. By 1887 Kraske[30] had perfected his technic of trans-sacral resection of the rectum. In 1890 Löhlein[31] presented a case of malignancy of the rectum found in a patient eight months pregnant. Labor was induced and a living child was delivered from below; three weeks later a Kraske resection was performed. Heineke,[32] in 1891, was the first to attempt surgery of malignancy during pregnancy. He performed a Kraske resection upon a patient six months pregnant; the results of this operation were not reported. It was not until 1899 that the surgeons, led by Hochenegg,[7] began to take an active interest in this problem. From that period on we note an increasing number of operations attempted during pregnancy. Of the eleven cases reported in the last fifteen years, five were diagnosed during the first two trimesters and in all the carcinoma was resected.

In the management of coexisting carcinoma of the rectum and pregnancy certain nonmedical as well as medical factors are pertinent. In some cases the religious convictions of the patient or her desire for a child may modify the treatment. The medical factors include the stage of the pregnancy, the stage of the neoplasm and the presence or absence of any complicating features either in the pregnancy or the neoplasm. If complications such as obstruction, perforation, hemorrhage or idiopathic ulcerative colitis are present, immediate surgery is mandatory without regard for the pregnancy. With advanced lesions palliative surgery, if necessary, should be such as to least disturb the gravid uterus.

It is generally agreed that during the first trimester when the uterus is relatively small the carcinoma should be resected without intentionally interrupting the pregnancy. The operation employed will vary with the experience of the surgeon but it should be adequate and conform to the principles of good cancer surgery. Of the eight reported cases in which surgery was performed during the first trimester, all of the patients survived the operation; in five cases in which the result of the pregnancy was stated, three living children were obtained.

During the second trimester it is more difficult to formulate a decision. Bacon and Rowe[9] recommend a Porro section, while Jennings[33] thinks that an interruption of the pregnancy is never necessary. We believe that a resection, particularly an abdominoperineal or abdominotrans-sacral resection, is feasible to the twentieth week of gestation without emptying or removing the gravid uterus. During the remainder of the second trimester, or from the twentieth to the twenty-seventh week, the course of action will depend upon the

TABLE III

CASES OF PRIMARY CARCINOMA OF THE RECTUM OR RECTOSIGMOID DIAGNOSED DURING THE THIRD TRIMESTER

No.	Author	Year Published	Age (yr.)	Stage of Pregnancy	Treatment of Pregnancy	Treatment of Mother	Results		Location of Lesion and Remarks
							Child	Mother	
22	Cruveilhier[2]	1837	30	Term	Breech extraction	None	Stillborn	Died 4 days postpartum	Rectum
23	Lever[1]	1843	..	Term	Spontaneous delivery from below	None	Stillborn	Died 7 mo. later	Rectum at 3½ in.
24	Hicks[28]	1879	..	8 mo.	Cesarean section	None	Living	Died 1 day postpartum	Rectum and vagina
25	Herman[44]	1879	30	Term	Cephalotripsy and delivery	None	Stillborn	Died 4 days postpartum	Rectum at 4 cm.
26	Kaltenbach[29]	1879	31	Term	Child dead; cesarean section	None	Stillborn	Died 6 days postpartum	Rectum
27	Polk[45]	1889	..	Term	Cesarean section	None	Living	Died 1 day postpartum	Rectum
28	Löhlein[31]	1890	32	8 mo.	Delivery from below	Kraske resection 3 wk. postpartum	Living	Living	Rectum
29	Zweifel[46]	1893	..	Term	Porro section	None	Died after delivery	Died postoperatively	Rectum
30	Freund[47]	1893	32	Term	Cesarean section	None	Living	Living	Rectum and rectovaginal fistula
31	Jordan[48]	1894	30	7 mo.	Porro section at 8 mo.	None	Died after delivery	Living	Rectum at 6 cm.
32	Riddett[49]	1897	37	Term	Cesarean section	None	Living	Living	Rectum at 10 cm.
33	Holzapfel[50]	1899	40	Term	Cesarean section	None	Living	Died 7 wk. postpartum	Rectum
34	Heineke[52]	1899	..	6 to 7 mo.	Not stated	Kraske resection at 6 to 7 mo.	Not stated	Not stated	Rectum
35	Heussner[51]	1900	43	8 mo.	Version and extraction	Posterior resection 17 days postpartum	Died second day	Living	Rectum
36	Kürstiener[40]	1900	27	Term	Cephalotripsy and delivery	None	Stillborn	Died 11 days postpartum from peritonitis	Rectum
37	Baldy[52]	1901	..	7½ mo.	Cesarean section	None	Living	Living	Rectum at 8 cm.
38	Endelman[53]	1902	32	7 mo.	Delivery from below	Resection 6 wk. postpartum	Died after delivery	Living	Rectum
39	Rossa[54]	1902	31	Term	Spontaneous delivery	Kraske resection 2 mo. postpartum	Living	Died 1 yr. later	Rectum
40	Semmelink[55]	1903	42	Term	Forceps delivery	None	Living	Died 2 mo. postpartum	Rectum
41	Russell[56]	1903	27	Term	Porro section	Colostomy	Not stated	Not stated	Inoperable carcinoma of rectum
42	Smits[57]	1905	27	Term	Cesarean section	None	Living	Died first postpartum day	Inoperable carcinoma of rectum
43	Nijhoff[8]	1905	18	Term	Delivery from below	None	Living	Died first postpartum day	Rectum at 7 cm.

Carcinoma of Rectum Diagnosed during Pregnancy

TABLE III (*Continued*)

No.	Author	Year Published	Age (yr.)	Stage of Pregnancy	Treatment of Pregnancy	Treatment of Mother	Results		Location of Lesion and Remarks
							Child	Mother	
44	Frank[4]	1905	24	7 mo.	Cesarean section	None	Living	Died 6 mo. postpartum	Recurrent carcinoma of rectum
45	Demelin and Coudert[58]	1906	..	Term	Porro section	None	Living	Died fourteenth postpartum day	Recurrent carcinoma of rectum
46	Clemenz[59]	1909	..	Term	Cesarean section	Resection 5 wk. postpartum	Living	Died in 1 yr.	Rectum
47	Commandeur[60]	1910	..	8 mo.	Cesarean section	Cecostomy and abdominoperineal resection postpartum	Living	Died after resection	Rectum
48	Heil[61]	1923	37	9 mo.	Cesarean section	Abdominal transsacral resection postpartum	Living	Living	Rectum
49	Katz and Kaspar[8] (Case 9)	1926	..	7 mo.	Premature delivery from below	Hochenegg resection postpartum	Died	Living	Rectum at 8 cm.
50	Katz and Kaspar[8] (Case 13)	1926	42	7 mo.	Delivery from below	Colostomy	Not stated	Died in 1 yr.	Rectum at 6 cm.
51	Katz and Kaspar[8] (Case 14)	1926	29	8 mo.	Early delivery with forceps	Surgery previous to delivery	Not stated	Not stated	Rectal ampulla
52	Katz and Kaspar[8] (Case 17)	1926	42	8 mo.	Delivery from below	Resection postpartum	Living	Living	Carcinoma with polyposis
53	Delbez[62]	1928	30	7 mo.	Delivery from below	Colostomy and postpartum trans-sacral resection	Died	Living	Diagnosed in second trimester but patient did not come in for treatment until 7 mo.
54	Katz[37] (Case 2)	1930	22	8 mo.	Porro section	Resection after delivery	Living	Died fifteen days postoperatively	Rectum at 6 cm.
55	Katz[37] (Case 3)	1930	28	7 mo.	Spontaneous delivery	Resection postpartum	Lived (?)	Recurrence with another pregnancy	Rectum at 4 cm.
56	Evers[6]	1928	38	Term	Cesarean section	None	Stillborn	Died sixth day postpartum from peritonitis	Lower sigmoid
57	Ducuing and Guilhem[63]	1939	31	7 mo.	Porro section	Colostomy postpartum	Living	Living	Rectum at 6 cm.
58	Swartley et al.[64]	1947	39	7½ mo.	Porro section	Abdominoperineal resection postpartum	Living	Living	Rectum at 10 cm.
59	Banner et al.[22]	1945	32	8 mo.	Delivered 4 days postopatively	Resection by Hartman procedure	Died	Died six days postpartum	Rectum at 14 cm.
60	Schlemenson et al.[65]	1950	42	8 mo.	Porro section	Resection postpartum	Living	Living	Rectum at 8 cm.
61	Berio et al.[66]	1952	37	8 mo.	Cesarean section	Abdominoperineal resection postpartum	Living	Died 8 mo. postoperatively	Rectum at 5 cm.
62	Berio et al.[66]	1952	40	6½ mo.	Vaginal cesarean section	Abdominoperineal resection postpartum	Living	Living	Rectum at 3 to 4 cm.

judgement of the surgeon relative to the curability of the lesion and the wishes of the patient for the child. Therefore, if the lesion appears to be curable and if the patient so desires, hysterotomy should be performed with resection to affect this cure. If the lesion is advanced, the pregnancy should be allowed to develop to the thirtieth or thirty-second week when a cesarean section and a resection of the lesion should be performed. Of the thirteen cases diagnosed during the second trimester, seven were operated upon. These seven were diagnosed early in the second trimester, and all but one were resected by posterior approach. A living child was delivered in five cases, and there was one postoperative death due to peritonitis.

TABLE IV
FETAL MORTALITY ACCORDING TO METHOD OF DELIVERY*

Method	Cases	Survived (%)	Died (%)	Unknown (%)
Cesarean section	15	80	13.3	6.7
Porro section	7	57	28	14
Vaginal delivery	17	35	53	12

* As reported in the literature.

TABLE V
MATERNAL MORTALITY ACCORDING TO METHOD OF DELIVERY*

Method	Cases	Survived (%)	Died (%)	Unknown (%)
Cesarean section	15	66.7	33.3	0
Porro section	7	57	28	14
Vaginal delivery	17	65	30	5

* As reported in the literature.

A diagnosis of carcinoma of the rectum during the last trimester demands cesarean section as soon as possible. With early lesions the section may be performed before the thirty-second week. This reduces the chances for a living child but also causes no long delay in the treatment of the carcinoma. With more advanced lesions it is better to perform the resection at or after thirty-two weeks. In the thirty-nine reported cases in which data are available, the fetal mortality for cesarean section was 13 per cent, for Porro section 28 per cent and for delivery from below 53 per cent. (Table IV.)

Maternal mortality was 33, 28 and 30 per cent, respectively. While the maternal mortality was about equal in the three procedures, we believe it is poor technic to allow the fetus to exert pressure and trauma to the tumor during the delivery. The cesarean section is an elective procedure and resection of the tumor should be carried out at the same time, unless there are other obstetric complications present. (Table V.)

CASE REPORTS

CASE I.* E. G., a thirty-four year old white para 1 was first seen on August 14, 1950. Her last menstrual period had been on June 11, 1950. She gave a history of having had diarrhea for one year, and bloody diarrhea for six months. There had been a 10 pound weight loss. She had also noticed lower abdominal pains for five days. Examination showed the presence of Grade 1 internal hemorrhoids and a friable polypoid tumor which arose from the anterior wall and surrounded about two-thirds of the circumference of the rectum 12 cm. above the anus. Biopsy of the lesion was reported as adenocarcinoma, Grade II. The patient was admitted to the hospital on August 20, 1950, and three days later anterior resection of the lower sigmoid and upper rectum with end-to-end anastomosis was performed. The postoperative course was free from any complications. The removed segment of colon and rectum, after being partially fixed, measured 23 cm. in length and the line of resection was 5 cm. beyond the distal extent of the neoplasm. Final microscopic diagnosis was adenocarcinoma, Grade II, widely infiltrating the rectal wall with no lymph node metastases demonstrated.

The patient was discharged from the hospital on the tenth postoperative day. Her pregnancy was uneventful and on March 22, 1951, she was delivered from below of a living child weighing 7 pounds.

Follow-up at regular intervals revealed that she was perfectly well four years and nine months after operation. In March, 1953 a 1 mm. polyp and in January, 1954 a 2 mm. polyp was fulgurated in the lower rectum.

CASE II.† G. H., a thirty-four year old

* Case of Drs. McLean and Arminski.

† Case of the late Dr. L. J. Braitman, Detroit, Michigan.

white gravida IV, para III was admitted to the hospital on November 30, 1951. Her last menstrual period had been on September 2, 1951. She gave a history of rectal bleeding for one year. Previously hemorrhoidectomy had been performed but the bleeding persisted. She also had had constipation for about five years and this had become more marked within the past year. There had been a slight weight loss and weakness during the month previous to admission. Sigmoidoscopic examination revealed the neoplasm at 10 cm. One surgical and two obstetric consultants recommended immediate therapeutic abortion which was performed, removing a fetus 6 cm. long. One week later abdominoperineal resection was performed. Microscopic diagnosis was adenocarcinoma, Grade IV, with metastases to the pararectal lymph nodes.

Follow-up examinations show that she has severe low back pain, but repeated roentgenograms have failed to reveal any neoplastic involvement of the spine.

CASE III.* R. T., a twenty-five year old white gravida II, had had her last menstrual period on February 19, 1952. Her chief complaint was increasing constipation with intermittent bleeding of fourteen months' duration and obstipation of four days' duration. The condition was diagnosed at about twenty weeks of gestation. The neoplasm, located at 10 cm., completely encircled the rectum. Biopsy showed it to be adenocarcinoma, Grade II. On July 21, 1952, transverse colostomy was performed. The pregnancy was allowed to go on to about twenty-five weeks and on August 19, 1952, cesarean section and supracervical hysterectomy were performed. The child died on the second day. Two weeks later abdominoperineal resection was performed. Final pathologic report showed that the tumor had completely infiltrated the rectal wall and there was massive carcinomatous replacement of the pararectal lymph nodes. Follow-up at thirty months revealed no evidence of recurrence.

CASE IV.† W. J. L., a thirty-three year old white woman, had had her last menstrual period on April 10, 1944. On October 14, 1944, or at about twenty-five weeks of gestation, she complained of bleeding with bowel movements. She was referred to Dr. Lynn Ferguson who found carcinoma of the rectum. The pregnancy was interrupted by rupturing the membranes and delivery from below. The child did not survive. On December 19, 1944, abdominoperineal resection was performed. The patient died in 1949 from metastases.

* Case of Dr. G. T. Bradley.

† Case of Dr. M. S. Ballard, Grand Rapids, Michigan.

COMMENTS

In an attempt to determine the incidence of primary carcinoma of the rectum diagnosed during pregnancy and the present day management of this condition, we have made a survey of the members of the Michigan Society of Obstetricians and Gynecologists. We found that seven cases have been diagnosed in approximately 350,000 pregnancies, or an incidence of 1 in 50,000 in the practice of this specialized group. In the world literature in the last fifteen years only eleven cases have been described. None of the previously mentioned seven cases from the obstetric group have been reported. Two of these cases together with two from our own practice are presented herein.

Many of the obstetricians and surgeons believe that it is necessary to terminate a pregnancy when carcinoma of the rectum is diagnosed during the first trimester. In fact, in our survey we found that over half of those who expressed an opinion gave this as their judgement. Case II illustrates this point. Some of the recent textbooks recommend this procedure. Lull and Kimbrough[34] state in their book on Clinical Obstetrics published in 1953, "In carcinoma of the rectum complicating pregnancy, with or without obstruction, resection is frequency followed by abortion and peritonitis so that hysterectomy and resection in the early pregnancy is the best treatment." We wish to emphasize that in the collected series of all the cases diagnosed in the first two trimesters no one considered it necessary to terminate the pregnancy, and of the fifteen operated cases only one succumbed to peritonitis and two aborted.

SUMMARY

The methods of treatment of primary carcinoma of the rectum or rectosigmoid diagnosed during pregnancy are determined by the stage of the pregnancy, the extent of the malignancy and the presence or absence of complications. Thus, the following treatments should be instituted depending upon the time of diagnosis:

1. Prior to the twentieth week of gestation—treat at once without regard for the pregnancy.

2. Between the twentieth and twenty-seventh week—treat according to the extent of the malignancy, namely, (a) early or presumably curable lesions—treat by hysterotomy and resection without delay; (b) advanced malignancy—treat by Porro section after the thirtieth week followed by appropriate palliative treatment for the malignancy.

3. After the twenty-seventh week—cesarean section at thirty to thirty-two weeks with resection of the tumor, or resection of the tumor two weeks later.

4. After the thirty-second week—treat as in paragraph 3 without delay.

5. At any stage of the pregnancy when the rectal malignancy is complicated by obstruction, perforation, severe hemorrhage or ulcerative colitis—treat at once without regard for the pregnancy.

REFERENCES

1. Lever, J. C. W. Pelvic tumors obstructing parturition. *Guy's Hosp. Rep.*, 1: 26–77, 1843.
2. Cruveilhier, J. Anatomie Pathologique du Corps Humaine, vol. 2, Livraison 33, pp. 7–10, 1835–1842.
3. Duncan, W. Cancer of the rectum, inguinal colotomy, pregnancy, caesarean section, recovery. *Lancet*, 1: 405–406, 1895.
4. Frank, Cited by Nijhoff.[5]
5. Nijhoff, G. C. Schwangerschaft und carcinoma recti. *Zentralbl. f. Gynäk.*, 29: 881–889, 1905.
6. Evers, H. H. A case of obstructed labour due to malignant disease of the sigmoid colon. *J. Obst. & Gynaec. Brit. Exp.*, 35: 525–527, 1928.
7. Hochenegg, J. Cited by Katz and Kaspar.[8]
8. Katz, H. and Kaspar, F. Mastdarmkrebs und Schwangerschaft. *Arch. f. Gynäek., Berlin*, 128: 250–292, 1926.
9. Bacon, H. E. and Rowe, R. J. Abdominoperineal proctosigmoidectomy for rectal cancer complicating pregnancy: report of four cases. *Southb. M. J.*, 40: 471–479, 1947.
10. Fournier, R. Étiologie particulière d'une péritonite post-partum. *Bull. Soc. d'obst. et de gynéc.*, 26: 241–244, 1937.
11. Kjelberg. Cited by Njhoff.[5]
12. Koch. Cited by Nijhoff.[5]
13. Maygrier, C. Tumeurs kystiques des ovaires; cancer squirreux et colloide du rectum et du vagin; fistula recto-vaginale consécutive; tumeurs secondaires dans la foie; avortment provoqué a d'obstruction intestinale. *Progr. méd., Paris*, 7: 645–647, 1879.
14. Lotheisen, Verhandlungen ärztlicher Gesellschaften und Vereine. *Wein. klin. Wchnschr.*, 7: 911, 1894.
15. LeGac, P. Cited by DerBrucke.[19]
16. Fairbairn, J. S. Acute abdominal emergencies complicating pregnancy and the puerperium. *Brit. M. J.*, 1: 456–459, 1927.
17. Mengert, W. F. Dystocia due to carcinoma of the rectum and of the vagina. *Am. J. Obst. & Gynec.*, 26: 451–454, 1933.
18. Micale, G. Cited by DerBrucke.[19]
19. DerBrucke, M. G. Intestional obstruction due to malignancy complicating pregnancy. *Am. J. Obst. & Gynec.*, 40: 307–313, 1940.
20. Finn, W. F. and Lord, J. W., Jr. Carcinoma of the colon producing acute intestinal obstruction during pregnancy. *Surg., Gynec. & Obst.*, 80: 545–548, 1945.
21. Putzki, P. S., Scully, J. H., Kotz, J., Kaufman, M. S. and Torrey, W. E. Carcinoma of colon producing acute intestinal obstruction during pregnancy. *Am. J. Surg.*, 77: 749–754, 1949.
22. Banner, E. A., Hunt, A. B. and Dixon, C. F. Pregnancy associated with carcinoma of the large intestine. *Surg., Gynec. & Obst.*, 80: 211–216, 1945.
23. Pommerenke, W. T. Pregnancy following radical resection of the rectum for carcinoma. *Am. J. Obst. & Gynec.*, 31: 522–524, 1936.
24. Mayo, C. W. and Hunt, A. B. Pregnancy complicating carcinoma of the rectum or carcinoma of the rectum complicating pregnancy. *Proc. Staff Meet., Mayo Clin.*, 16: 513–516, 1941.
25. Mussey, R. D. and Crane, J. F. Operations of necessity during pregnancy. *Arch. Surg.*, 15: 729–736, 1927.
26. Porro, E. Cited by Spivack.[70]
27. Sänger, M. Cited by Spivack.[70]
28. Hicks, J. B. Case of caesarean section. *Tr. Obst. Soc. London*, 20: 106–109, 1879.
29. Kaltenbach, R. Sectio caesarea wegen Carcinom des rectums. *Ztschr. Geburtsb. u. Gynäek.*, 4: 191–196, 1879.
30. Kraske, P. Cited by Katz and Kaspar.[8]
31. Löhlein, H. Carcinoma Recti als indication für die Kunstliche Fruhgeburt und als Ursache einer Puerperalfieber-Endemie. *Ztschr. Geburtsb. u Gynäek.*, 18: 69–81, 1890.
32. Heineke, Cited by Holzapfel.[50]
33. Jennings, E. M. Multiple primary malignant tumors of rectum and breast complicating pregnancy; report of a case. *J. A. M. A.*, 148: 736–740, 1952.
34. Lull, C. B. and Kimbrough, R. A. Clinical Obstetrics, p. 344. Philadelphia, 1953. J. B. Lippincott Co.
35. Rosner. Cited in Frommel's Jahresbericht über die Fortschritte auf dem Gebiete der Geburtshilfe and Gynäkologie. 30: 281, 1917.
36. Maunsell, C. B. Carcinoma of the rectum complicated by pregnancy; two cases treated by excision. *Brit. M. J.*, 1: 826–827, 1925.
37. Katz, H. Weitere Beiträge zur Kenntis des Mastdarmkrebses in der Schwangerschaft. *Arch. f. Gynäek.*, 143: 150–165, 1930.
38. Potter, J. B. Case of pregnancy complicated with malignant growths in the vagina and rectum. *Tr. Obst. Soc., London*, 20: 110–113, 1878.
39. MacVie, S. Mother versus child; notes of a case of induction of premature labour in a patient who

had rectal carcinoma. *Tr. Edinburgh Obst. Soc.*, 24: 123–131, 1899.
40. KÜRSTIENER, Cited by Krause.[68]
41. PETERSEN, Cited by Krause.[68]
42. KYNOCH, J. A. Pregnancy and labour complicated by rectal cancer. *J. Obst. & Gynaec. Brit. Emp.*, 14: 115–117, 1908.
43. SADUGOR, M. G. Carcinoma of the rectum complicating pregnancy. *California Med.*, 70: 489–490, 1949.
44. HERMAN, G. E. On the treatment of pregnancy complicated with cancerous disease of the genital canal. *Tr. Obst. Soc., London*, 20: 191–289, 1879.
45. POLK, Cited in Frommel's Jahresbericht über die Fortschritte auf dem Gebiete der Geburtshilfe und Gynäkologie. 2: 284, 1889.
46. ZWEIFEL, Cited in Frommel's Jahresbericht über die Fortschritte auf dem Gebiete der Geburtshilfe und Gynäkologie. 6: 372, 1893.
47. FREUND, Cited by Holländer.[67]
48. JORDAN, J. F. A successful case of Porro's operation for cancer of the rectum. *Brit. M. J.*, 1: 299, 1894.
49. RIDDETT, A. J. A case of caesarean section for cyesis complicated by malignant disease of the rectum. *Lancet*, 2: 600, 1897.
50. HOLZAPFEL, K. Kaiserschnitt bei Mastdarmkrebs. *Beitr. Geburtsh. u. Gynäk.*, 2: 59–67, 1899.
51. HEUSSNER, Cited by Krause.[68]
52. BALDY, J. M. Cesarean section for cancer of the rectum. *Am. J. Obst. & Gynec.*, 43: 58–60, 1901.
53. ENDELMAN, Z. Beitrag zum geburtshilflichen Verfahren bei Komplikation der Schwangerschaft durch Mastdarmkrebs. *Zentralbl. f. Gynäk.*, 26: 848–851, 1902.
54. ROSSA, Komplikation der Schwangerschaft und Geburt mit Mastdarmkrebs. *Zentralbl. f. Gynäk.*, 26: 1241–1245, 1902.
55. SEMMELINK, H. B. Complicatie van zwangerschafs en baring met carcinoma recti. *Nederl. Tijdschr. v. Geneesk.*, 39: 300–305, 1903; Translated in: *Zentralbl. f. Gynäk.*, 27: 73–75, 1903.
56. RUSSELL, A. W. Cancer of the rectum as a complication of pregnancy and labour. *Scot. M. & S. J. Edinb.*, 13: 499–507, 1903.
57. SMITS, Cited by Nijhoff.[5]
58. DEMELIN and COUDERT, Dystocie par cancer du rectum; opération césarienne suivie d'hysterectomie abdominale subtotale. *Bull. Soc. d'obst. de Paris*, 9: 176–180, 1906.
59. CLEMENZ, E. Intraperitoneale Operationen bei Schwangerschaft oder Geburt complicirenden Tumoren. *Arch. f. Gynäek., Berlin*, 89: 245–262, 1909.
60. COMMANDEUR, M. Opération césarienne pour cancer du rectum à 8 mois et demi de grossesse. *Bull. Soc. d'obst. de Paris*, 12: 469–473, 1910.
61. HEIL, K. VON. Über die Komplikation von Schwangerschaft mit Mastdarmkrebs. *Monatschr. f. Geburtsh. u. Gynäek.*, 62: 179–186, 1923.
62. DELBEZ, L. Carcinome du rectum et grossesse. *Liége méd.*, 21: 195–196, 1928.
63. DUCUING, J. and GUILHEM, P. Cancer du rectum et grossesse. *Bull. Soc. d'obst. et de gynéc.*, 28: 510–513, 1939.
64. SWARTLEY, W. B., NEWTON, Z. B., HARTMAN, J. C. and STAYMAN, J. W., JR. Perforated carcinoma of the large intestine complicating pregnancy; successful operative management. *Ann. Surg.*, 125: 251–256, 1947.
65. SCHLEMENSON, M., RUBOVITS, F. E. and ABRAMS, B. Cancer of large intestine complicated by pregnancy. *J. Internat. Coll. Surgeons.*, 13: 96–97, 1950.
66. BERIO, J. M., HERETER, J. A., BERTRAM, J. M. and TAVERAS, J. E. Carcinoma of the rectum complicating pregnancy. *Bol. Asoc. méd. de Puerto Rico*, 44: 392–399, 1952.
67. HOLLÄNDER, E. Ueber die vom Mastdarm ausgehenden Geburtsstörungen. *Arch. f. Gynäek., Berlin*, 44: 149–164, 1893.
68. KRAUSE, K. A. Mastdarmcarcinom mit Schwangerschaft. Bonn, 1900. Inaug-Dissert.
69. RIEMAN, C. 5 Fälle von Geburtsstorungen durch Tumoren. *Arch. f. Gynäek., Berlin*, 83: 720–732, 1907.
70. SPIVAK, J. L. The surgical technic of abdominal operations, 3rd ed., p. 696. Chicago, 1941. S. B. Debour.
71. GILCHRIST, R. K. and DAVID, V. C. Prognosis in carcinoma of the bowel. *Surg., Gynec. & Obst.*, 86: 359–371, 1948.

Management of Proctologic Disease in Pregnant and Parous Women

MARK M. MARKS, M.D. AND GEORGE H. THIELE, M.D., *Kansas City, Missouri*

IN reviewing the histories of our private patients we found that about 85 per cent of parous women first experienced anorectal symptoms during their first pregnancy or immediately following the birth of their first child. This information and the fact that there has been no crystallization of opinion as to the proper management of anorectal disease in women during pregnancy motivated this study.

Does the high incidence of rectal disease during pregnancy indicate a lack of understanding on the part of the obstetrician? If these patients are referred to a proctologist, are they properly managed? We believed that the best source of information would be found in questionnaires sent to recognized proctologists and obstetricians.

Questions concerning hemorrhoidal disease were used because it is representative of the anorectal disturbances which occur most frequently during pregnancy. Inquiries concerning the role of chronic ulcerative colitis in relation to pregnancy, when the two coexist, were also included. These questions and our interpretations of the answers follow.

QUESTIONS ASKED PROCTOLOGISTS

1. *Question:* Should simple hemorrhoids which have never been symptomatic be operated upon prior to anticipated pregnancy?

Answer: The unanimous reply was that hemorrhoidectomy should never be performed simply because hemorrhoids are present. We agree with this opinion.

2. *Question:* If there is a definite history of symptomatic hemorrhoidal disease during or immediately following a preceding pregnancy, should the hemorrhoids, if non-symptomatic, be operated upon prior to a succeeding pregnancy?

Answer: The answers were about evenly divided. Half of the proctologists believed that a prophylactic hemorrhoidectomy should be performed. The other half stated that such surgery should be undertaken only if the patient's hemorrhoidal disease continued to be symptomatic.

Our attitude favors prophylactic hemorrhoidectomy. Pope[1] pointed out that diseases of the vascular elements of the *anorectum* increase during pregnancy. Our experience shows that once this vascular bed has been damaged, each succeeding pregnancy further increases the symptoms of hemorrhoidal disease. Many a young mother has confided that her rectal disease (which the obstetrician regarded with complacency) was far more troublesome than the pregnancy or the delivery. She often suggested hemorrhoidectomy before the next pregnancy.

The obstetricians must learn that modern hemorrhoidectomy will prevent further difficulties during subsequent pregnancies and that their patients will remain well.

3. *Question:* If a pregnant woman has large, inflamed hemorrhoids (with or without prolapse), would you advise operation during pregnancy? If so, at what stage during pregnancy should hemorrhoidectomy be performed?

Answer: Sixty per cent of those who responded believed that such hemorrhoids should be removed during pregnancy; of this group, 80 per cent believed that it should be done in the second trimester. We believe that operation in the second trimester will prevent many instances of widespread hemorrhoidal thrombosis which otherwise would occur during the last days of pregnancy or at the time of delivery.

4. *Question:* (A) When complications (abscesses, ulcerated fissures, acute external thromboses or others) occur, how much additional surgery other than palliative do you perform? (B) During what months of pregnancy do you consider such additional surgery consistent with good surgical judgment?

Answer: Fifty-four per cent of the replies stated that only the simplest measures should be used to control the symptoms. If additional

surgery is required, they would prefer to wait until the second trimester if possible.

None reported anorectal surgery as a cause of premature labor. We believe that proctologic surgery can safely be performed at any time from the fourteenth week (when the ovum is well implanted) up to the last month. Except in an emergency surgery should not be undertaken during the last month because the wounds should be healed prior to delivery.

5. *Question:* (A) Do you inject internal hemorrhoids during gestation? (B) If so, what solutions do you prefer?

Answer: Seventy-five per cent answered that they used injection therapy. Quinine and urea hydrochloride and phenol-in-oil are used with almost equal frequency. Many who used the quinine solution called attention to the fact that the dosage of the quinine is so small as to be negligible.

6. *Question:* Except in emergencies (acute thrombotic disease, abscess, fistula, carcinoma) how long after delivery should proctologic surgery be postponed?

Answer: The consensus of opinion was that such surgery should be postponed until about the eighth week after delivery.

We do not disagree with this opinion. However, we have all been impressed with the rapidity of healing during or immediately following pregnancy, doubtless due to increased blood supply and persisting hormonal balance. There seems little more reason to postpone anorectal surgery for eight weeks than to delay the repair of an episiotomy or a perineal laceration for a similar period. A freshly operated anorectum may actually be much cleaner than it was prior to surgery. When proctologic surgery can be postponed, the eight-week delay should allow sufficient time for resolution of the pelvic engorgement and subsidence of acute inflammatory states.

7. *Question:* What advice do you give the obstetrician concerning the management of a patient with pre-existing ulcerative colitis who has recently become pregnant?

Answer: One-fourth of the proctologists stated that they had never been asked for such advice. Three-fourths advised that the patient be treated as if she were not pregnant. Twelve per cent believed that abortion would be indicated only if the colitis became so severe that the life of the mother was endangered. Kallet,[2] in a paper read before this society three years ago, reported eight therapeutic abortions in a series of 162 gestations, including 143 from the literature and his own series of twenty-nine gestations in twenty-one patients. Spontaneous abortion occurred thirteen times.

8. *Question:* In your experience or opinion, does pregnancy adversely affect the course of pre-existing chronic ulcerative colitis? Please comment.

Answer: Twenty per cent of the respondents stated that they had not observed pregnancy during ulcerative colitis. Thirty per cent had noted adverse effects by pregnancy. Forty per cent had not seen pregnancy exert an adverse effect on the disease. Furthermore, 27 per cent had observed improvement of pre-existing ulcerative colitis during gestation. Comparatively, Kallet[2] stated that when pregnancy occurred in patients with chronic ulcerative colitis, 40 per cent were aggravated, 22.4 per cent were not, and 30.4 per cent were improved. He also noted that should the colitis begin or become acutely exacerbated during the last trimester, the prognosis was apt to be more serious. He reported twelve such cases. It appears that the aggregate experience of the members of this society as to the effect of pregnancy upon chronic ulcerative colitis is in general agreement with the experience of eight groups of observers as reported by Kallet.

9. *Question:* Have you observed any adverse effect of pre-existing ulcerative colitis upon pregnancy? Please comment

Answer: Sixty-four per cent of the respondents have never seen ill effects of pre-existing ulcerative colitis upon pregnancy. Only 5 per cent had ever noticed any ill effects on gestation. These effects were listed as miscarriage or premature delivery in all but two instances in which anemia was the symptom listed. Kallet[2] reported the following effects: spontaneous abortions, 8 per cent; therapeutic abortions, 5 per cent; and premature births, 2 per cent. Specific symptoms that caused the interruption of pregnancy were not mentioned. Felsen and Wolarsky,[3] in discussing this phase of the subject conclude, "Pregnancy generally has a salutory effect on chronic ulcerative colitis. Rarely is termination of pregnancy indicated. Our experience covers 117 pregnancies in 72 patients. During 59 per cent of these pregnancies the patients felt well symptomatically and this state was reflected in the improved or absent sigmoidoscopic findings."

QUESTION ASKED GASTROENTEROLOGISTS

A number of recognized gastroenterologists* were also questioned.

1. *Question:* What has been your experience with the coexistence of pregnancy and chronic ulcerative colitis?

Answer: They strongly indicated that there was no categorical answer as to the effect of pregnancy on the disease. Since reactions can be seen from one extreme to the other, each case should be considered separately. They also pointed out that the patient's attitude toward her pregnancy was an important factor. Concerning the effect of colitis upon pregnancy, they believed (with few exceptions) that unless the disease was seriously debilitating the pregnancy was rarely disturbed.

QUESTIONS ASKED OBSTETRICIANS

The questions asked obstetricians (all Diplomates of the American Board of Obstetrics and Gynecology), their replies and our comments follow.

1. *Question:* Do you routinely take a proctologic history from your patients? Please indicate the subjects covered by this history.

Answer: Three-fourths of the obstetricians take such a history. Questions as to bleeding, constipation, change in bowel habit, presence of hemorrhoids, pain, protrusion, rectal discharge, diarrhea and the use of laxatives were the most frequently asked in the order named.

2. *Question:* Do you perform a routine digital and anoscopic anorectal examination?

Answer: Three-fourths of the obstetricians perform a routine digital examination; anoscopic examination was done by only five of them, if they believed it was indicated by digital examination.

Pathologic findings such as hypertrophied papillae, low-lying rectal tumors, fecal impactions, congenital anomalies or strictures can be detected easily with the finger. Yet we know that internal hemorrhoids are not palpable unless fibrosed or thrombosed, and that digital examination has but limited use at best. If the obstetricians would only use an anoscope as routinely as they use a tongue depressor, they would be amazed at the variety and extent of the abnormalities they would discover—internal hemorrhoids, cryptitis, papillitis, leukoplakia and rectal polyps being included in the list.

3. *Question:* When *prolapsing* internal hemorrhoids are found, do you advise hemorrhoidectomy prior to subsequent gestation, or early in pregnancy if the patient is pregnant at the time of consultation?

Answer: More than three-fourths believed that removal of *prolapsing* internal hemorrhoids was advisable before a succeeding pregnancy; but should the condition exist early in pregnancy, operation should be postponed until the second trimester. A few obstetricians expressed the belief that women, regardless of their anorectal difficulties, should wait until the end of their child-bearing period before undergoing definitive surgery.

It is difficult to understand this reasoning. Apparently we have not convinced a sufficient number of obstetricians that a woman who has had a good hemorrhoidectomy during her child-bearing period need not fear a recurrence of her hemorrhoids during subsequent pregnancies. One-fifth of the obstetricians agreed that hemorrhoidectomy might be performed safely any time from the third to the seventh month inclusive.

4. *Question:* When proctologic complications arise during pregnancy, do you obtain proctologic consultation?

Answer: An affirmative answer was given by 90 per cent.

This information is encouraging and would indicate that a trend is being established which is as yet not widespread. We still see too many young women whose rectal symptoms during pregnancy have apparently been treated by skillful neglect.

5. *Question:* When proctologic surgery during pregnancy is advised by the consultant or seems advisable to you, at what stage do you permit or advise surgery?

Answer: After proctologic consultation one-third of the respondents allow surgery only during the interval between pregnancies. Sixty per cent allow surgery during pregnancy and most of these prefer that it be performed during the first or second trimesters, the remainder believing that proctologic surgery may be undertaken at any time during the pregnancy.

* W. Palmer, Chicago, Ill.; G. C. McHardy, New Orleans, La.; L. Schiff, Cincinnati, Ohio; H. L. Bockus, Philadelphia, Pa.; J. A. Bargen, Rochester, Minn.; S. M. Jordan, Boston, Mass.; C. Jones, Boston, Mass.; A. Andresen, Brooklyn, N. Y.; W. Alvarez, Chicago, Ill.; A. H. Aaron, Buffalo, N. Y.

The remaining 10 per cent of the respondents were willing to follow the proctologist's advice.

Curiously, although comments were made quite freely, not one correspondent reported a miscarriage or premature labor as the result of anorectal surgery. Furthermore, none of the proctologists made any such report. We must conclude, therefore, that hemorrhoidectomies during pregnancy are not attended by any risk to the mother or to her pregnancy.

6. *Question:* Do you routinely postpone all anorectal surgery until after delivery, excepting of course the incision of abscesses and the removal of acute thrombosed external hemorrhoids?

Answer: Eighty-six per cent indicated that they routinely postponed all surgery except the treatment of abscesses and thrombotic external hemorrhoids.

The answers to this question and question 5 may seem to be contradictory, but we are sure they are not. We believe the obstetricians mean that they routinely delay surgery until the interval between pregnancies. If, however, they are advised to do otherwise by the consulting proctologist, 60 per cent of them are agreeable to surgery during pregnancy.

7. *Question:* Except in cases of emergency or very painful lesions, how long after delivery should anorectal surgery be postponed?

Answer: The average postpartum delay recommended was eight to ten weeks. May we comment again that a hemorrhoidectomy wound will heal well when the operation is performed immediately (four to five days) after delivery, and cite the example of the healing of an episiotomy.

8. *Question:* Based on your personal experience, is non-specific ulcerative colitis adversely effected by pregnancy?

Answer: Forty per cent had had no experience with the coexistence of ulcerative colitis and pregnancy. Fifty per cent stated that pregnancy did not adversely affect ulcerative colitis, and in three instances notation was made that pregnancy might improve the colitis. Ten per cent of the respondents stated that they had observed an adverse affect on ulcerative colitis and cited two cases in which depletion from the colitis ultimately lead to abortion.

9. *Question:* Based on your personal experience, is pregnancy adversely affected by non-specific ulcerative colitis?

Answer: Forty per cent had had no experience with the coexistence of the two conditions. Fifty-one per cent answered no. There were two instances in which spontaneous abortion was presumably caused by ulcerative colitis.

In answering these last two questions, a number of the obstetricians called attention to the fact that when one condition adversely affected the other, almost without exception the patient did not wish to be pregnant. She therefore was under considerable emotional stress, and the answers indicated that these patients may have been using the coexisting ulcerative colitis as an excuse for a desired interruption of pregnancy.

10. *Question:* Under what circumstances, based on your personal experience, is non-specific ulcerative colitis an indication for the interruption of pregnancy?

Answer: Again 40 per cent had had no experience with the coexistence of the two conditions. Fifty per cent believed that ulcerative colitis was never an indication for interruption. Ten per cent believed that pregnancy should be interrupted only if the ulcerative colitis became so severe as to threaten the patient's life. Russell,[4] in discussing the indications for the interruption of pregnancy in eighty-eight patients in a general hospital, lists ulcerative colitis as the indication in only one instance.

11. *Question:* If dietary management and increased fluid intake fail to control constipation during pregnancy, what laxatives (first and second choice) do you prescribe?

Answer: Preferences were as follows: 30 per cent for bulk laxatives, 30 per cent for milk of magnesia, 20 per cent for mineral oil and 20 per cent for cascara preparations.

It is of interest to note the variety of laxatives chosen by the obstetricians to correct stasis in the terminal colon. It would seem that the application of the known physiologic principles underlying normal bowel habits would be of considerable help to the obstetrician and his patients.

12. *Question:* Have you found evidence of anorectal disease more frequent among patients for whom you have prescribed (a) mineral oil or preparations containing it, (b) bulk laxatives and (c) other laxatives? Please specify. Answer this question carefully giving percentages of incidence of anorectal disease if possible.

Answer: One-half of the respondents believed that the use of laxatives bore no relationship whatever to the incidence of anorectal disease. About 15 per cent believed that anorectal disease was more prone to develop in those patients in whom watery or loose stools were produced, and an additional 12 per cent believed that anorectal disease was more frequent in those patients in whom mineral oil had been prescribed. Twelve per cent thought that bulk laxatives were to blame for an increased incidence of anorectal disease.

This subject was investigated by one of us[5] and it was found that the incidence of acute anorectal disease was three times as common in pregnant women who had used mineral oil or saline laxatives as in those for whom these preparations had not been prescribed. The study covered a series of almost 2,000 pregnant women from the services of two obstetricians. The incidence of acute anal fissure in private proctologic practice was also found to be three times as common in patients who had used mineral oil or saline laxatives.

CONCLUSIONS

Eighty-five per cent of parous women date the beginning of anorectal symptoms from their first pregnancy or delivery. If symptomatic hemorrhoidal diseases develops with pregnancy or delivery, prophylactic hemorrhoidectomy should be performed prior to succeeding pregnancies. Delay can only result in increasing morbidity, and after anorectal surgery succeeding pregnancies will not be found to cause recurrent hemorrhoidal disease.

If hemorrhoidal disease is severe, hemorrhoidectomy may be performed with absolute safety at almost any stage of pregnancy, particularly between the fourteenth and thirty-second weeks.

When anorectal surgery is postponed until after delivery, the consensus of opinion suggests a delay until the eighth to tenth postpartum week.

One-third of the obstetricians questioned allow anorectal surgery only between pregnancies, although neither they nor the proctologists cited a single instance of miscarriage or premature delivery as a result of anorectal surgery during pregnancy.

Injection of internal hemorrhoids during pregnancy is frequently performed and no ill effects are cited. The choice of sclerosing agent is not to be influenced by pregnancy.

When pregnancy and ulcerative colitis coexist, the colitis should be treated as if the patient were not pregnant. In brief, the effect of pregnancy upon pre-existing ulcerative colitis may be stated as follows: In approximately one-third of cases there will be no effect, in one-third of cases the ulcerative colitis will be improved, and in about one-third of cases there will be an adverse effect upon the colitis.

Ulcerative colitis will harmfully affect pregnancy in not more than 5 per cent of cases. The most common effects will be anemia or general depletion and the least common will be spontaneous abortion.

The obstetrician believes that ordinarily ulcerative colitis does not adversely affect pregnancy, and that it is almost never an indication for the interruption of pregnancy.

Regarding the obstetrician's management of the bowel of a pregnant woman, it is evident that only rarely do they perform an anoscopic examination, although anorectal complications are among the most frequent. Anoscopic examination is to be strongly stressed because digital examinations are insufficient.

Obstetricians should be assured that to avoid recurrent disease it is not necessary to postpone anorectal surgery until after the child-bearing period.

REFERENCES

1. Pope, C. E. Anorectal complications of pregnancy. *Am. J. Surg.*, 84: 579–591, 1952.
2. Kallet, H. I. Influence of pregnancy on chronic ulcerative colitis. *Am. J. Surg.*, 84: 574–578, 1952.
3. Felsen, J. and Wolarsky, W. Acute and chronic bacillary, dysentery, and chronic ulcerative colitis. *J. A. M. A.*, 153: 1069-1072, 1953.
4. Russell, K. P. Therapeutic abortion in a general hospital. *Am. J. Obst. & Gynec.*, 62: 434–438, 1951.
5. Thiele, G. H. Mineral oil and saline laxatives: relationship to anorectal infections and their treatment. *South. M. J.*, 35: 920–926, 1942.

DISCUSSION OF PAPERS BY McLEAN, ARMINSKI AND BRADLEY, AND MARKS AND THIELE

J. Thornton Wallace (Brooklyn, N. Y.): I have listened with a great deal of interest to the papers presented by Dr. McLean et al., and Drs. Marks and Thiele. It is regrettable that more obstetricians could not have heard them and it is to be hoped that their papers may yet find their way into obstetric circles.

As is so often the case I would imagine that coincidence played at least some part in enabling the authors to report from their own experience four cases of so rare a lesion as carcinoma of the rectum in pregnant women. Its rarity is due largely to the fact that the condition so seldom occurs in the age group represented by pregnant women. A careful search through our cross index files at The Brooklyn Hospital failed to reveal a single such case in the past twenty years; this represents a total of some 30,000 deliveries. Dr. H. W. Gerdes, who has recently collected all the abdominal surgical cases operated upon during pregnancy at this hospital during the past ten years, found no cases of carcinoma of the rectum or sigmoid.

As a gynecologist and obstetrician, it seems to me that the authors have enunciated a rational and conservative approach to the problem. They have delineated clearly and concisely a method for dealing with the lesion in each stage of pregnancy. I am in complete accord with their ideas.

The very high maternal mortality, which I assume was primary, in the previously reported cases is probably due to the fact that many of these patients were operated upon before the era of potent chemotherapeutic agents and antibiotics. These, along with improved transfusion facilities and operative technics, should make this radical type of surgery during pregnancy much safer than before. I thoroughly agree with the statement that these patients should be delivered by cesarean section rather than vaginally. I am still loathe to perform other than that which is absolutely necessary, or at most some relatively minor added surgery, at the time of cesarean section and would favor a policy of performing bowel surgery at a later date.

While carcinoma of the rectosigmoid is one of the rarest lesions seen in pregnant women, hemorrhoids are one of the most common extragenital diseases seen in such women. Although the authors have stated that the vast majority of parous women having hemorrhoids date their first appearance from a pregnancy, it can by no means be inferred that the majority of parous or pregnant women do have hemorrhoids, for such is not the case. I think it is likewise only logical to point out that the viewpoint of the proctologist and obstetrician may each possibly be somewhat distorted by the fact that the proctologist is apt to see only those pregnant women who have hemorrhoids whereas the obstetrician sees a preponderance of pregnant women who do not have them. Also, the truth of the statement that hemorrhoidal surgery is just as successful in the pregnant as in the non-pregnant woman hinges to some degree on the availability of trained proctologic surgeons. There are many communities where such men are not available and this factor is, of necessity, ever present in the minds of many obstetricians. This same factor is likewise present in the so-called prophylactic hemorrhoidectomy. In this connection it should be emphasized again that as with varicose veins, hemorrhoids will often regress to an almost unbelievable degree after the pregnancy has terminated. Proper bowel hygiene may accomplish a great deal in preventing the recurrence of hemorrhoids during subsequent pregnancies. There is an old clichè commonly bandied about in obstetric circles—lubrication from above prevents troubles from below. This refers, of course, to the use of mineral oil in pregnant women in the hope of preventing hemorrhoids or ameliorating those which already exist. In this connection the comments of Drs. Marks and Thiele and statistics regarding rectal complications following the use of mineral oil for the control of constipation are most illuminating, particularly with respect to anal fissures. Furthermore, while it is agreed that such surgery does not increase the incidence of abortion or premature labor, it must be borne in mind that should such occur following anorectal surgery, it is at times very difficult to convince the patient and her relatives that there is no connection between these unfortunate occurrences and the surgery. I think I can say with a fair degree of accuracy that the prevailing opinion and practice in the locality from which I come is to treat these conditions conservatively and symptomatically with reservation of surgery for those cases in which conservative treatment is unsuccessful. Certainly such surgery should be postponed, if possible, until the second trimester of the pregnancy and should be avoided during the last few weeks of pregnancy. By the same token that healing is promoted by the pregnancy, so also is bleeding as the result of the increased vascularity present at this time which may be annoying during surgery. We feel much the same toward the injection of hemorrhoids during pregnancy as we do about surgery.

It is interesting and illuminating to hear that so large a percentage of obstetricians in the section of the country from which the authors come do routine digital rectal examinations with the primary purpose in mind of discovering existing symptomless pathologic conditions of the rectum. Perhaps we have been somewhat remiss in not doing so, with the thought in mind that a really important pathologic condition such as malignancy may be felt by vaginal just as by rectal examination. We have employed rectal examinations largely to avoid vaginal examinations in the later weeks of pregnancy and to evaluate the mobility of a coccyx which was thought to be somewhat fixed in early pregnancy. Perhaps we too should familiarize ourselves more thoroughly with the anoscope in the hope of making more widespread discovery of anorectal lesions.

With ulcerative colitis, we, as apparently is true with many of your obstetricians, have had little experience. What experience we have had would lead us to believe that here, as with most diseases coexistant with pregnancy, it is best to treat the disease and leave the pregnancy to care for itself. If, as seems to be true in a large proportion of these cases, the causative factor is psychogenic, psychotherapy may be just as successfully employed as in the non-pregnant. Therapeutic abortion should be performed only when the mother's life is seriously threatened.

THOMAS F. JACQUES (Denver, Colo.): In my opinion the management of anorectal complications during pregnancy and the postpartum period is of great importance. The authors of these two fine papers are to be congratulated on their coverage of this very controversial subject. The modern texts on the subject generally follow the same pattern, advocating control of constipation and the use of compresses and ointments when surgery is often indicated and generally neglected. I have been interested in this subject for some time and believe that we, as proctologists, owe the pregnant woman more hope of relief during her pregnancy than these palliative measures afford.

In an effort to obtain the ideas of others I sent a questionnaire to obstetricians and proctologists, similar to the one of Drs. Marks and Thiele. My findings were also similar to theirs; however, I found little difference between the opinions expressed by obstetricians and proctologists. Approximately 25 per cent of both groups showed no hesitancy in treating the pregnant patient in the same manner as the non-pregnant patient, if the indications were present. Another group of approximately 25 per cent subscribed very definitely to the theory of no treatment other than palliation whenever the patient was pregnant. The largest group of approximately 50 per cent was more conservative in their attitude, wanting to individualize each patient on the basis of how much discomfort was present, the extent of the pathologic condition found on examination and what response to conservative therapy had been obtained. This group generally would not advocate surgical interference unless all other measures had failed.

Concerning postpartum surgery the time varied from immediately to six months, the majority favoring at least six weeks. I favor surgery two to three days postpartum for many reasons. It is usually easier for the patient to undergo surgery at this time rather than to return to the hospital at a later date; the expense is not as great, there is less time lost, the nursing mother can continue to nurse her baby while in the hospital, and the problem of care for the baby and other children during a return visit to the hospital is eliminated. There is no reason why a surgeon's judgment as to how much to remove should not be as good at this time as at any other, and the healing is just as satisfactory, if not better.

May I stress that conservative management of anorectal disorders during pregnancy is the treatment of choice if the patient's symptoms can be alleviated. However, if the proctologist is confronted with indicated surgery, this should be carried out whether the patient is pregnant or not and regardless of the stage of gestation. Normally the pregnancy will be undisturbed. Far too many decisions are based on the presence of pregnancy rather than the anorectal complication and its proper treatment.

I hesitate to discuss the paper of Dr. McLean et al. since I have never seen a case such as they reported. I was, however, very interested in the authors' findings and agree wholeheartedly with their method of treatment of this problem. In the questionnaire previously mentioned I asked for opinions on this subject, and it was the recommendation of the majority that a radical operation of choice be carried out with relative disregard to the pregnancy. If the size of the uterus interferes with surgery it should be emptied. When the patient is at or near term, cesarean section should be performed followed by radical surgery for the carcinoma.

I have enjoyed discussing these two papers. I hope there will be more articles on this subject by obstetricians as well as proctologists so that a better understanding between the two will develop on how best to handle these troublesome rectal complications occurring during pregnancy.

DON W. MCLEAN (closing): I would like to thank Drs. Wallace and Jacques for their remarks.

To those of you who are particularly interested in the technic of rectal resections during pregnancy, we believe that the period during which a conservative resection can be carried out in pregnancy can be considerably lengthened by using a combined abdominal and transsacral approach.

In conclusion, let me say that after limited personal experience and a careful review of this subject, we are convinced that the pessimism with which the proctologist usually regards this problem is not justified by the facts. We believe that a more helpful and courageous approach is indicated.

MARK M. MARKS (closing): The questionnaires that were used to make this study were answered by qualified proctologists as well as obstetricians. The crystallization of opinion was on a national basis.

Dr. Wallace seemed to question the need for better proctologic examinations in women who visited their obstetricians. It is well known that beyond the anal integument there are no sensory elements to warn of danger. Digital examination

alone is limited in its usefulness and the complete disregard of potential problems in the anorectal region, as done by many obstetricians, remains sadly lamentable.

A sample incident may illustrate this point. Some time ago I was called to see a woman in labor because of her lack of progress associated with frank bleeding from the rectum. Digital and anoscopic examination showed multiple polyps with induration of the upper third of the rectum. On cesarean delivery an invading carcinoma of the rectosigmoid was found which caused obstruction to the fetal head. Multiple polyps were scattered throughout the entire bowel.

This woman gave no history of bowel disorder. A simple proctologic examination at any time during her gestating period would have forewarned her obstetrician.

Regarding injection treatment for hemorrhoids, no cure was implied; rather this safe and effective method was a temporary means of arresting hemorrhoidal bleeding.

There are proctologic emergencies that arise during pregnancy and they must be attended to to relieve pain and prevent further complications. These patients heal well and, as has been pointed out, even better than without the presence of pregnancy. We found no reason to believe that such emergency surgery would precipitate a delivery.

There have been many taboos concerning the pregnant and parous woman. Dr. Thiele and I hope that through your answers to our questions some light has been shed on this subject. We heartily thank you for your cooperation and the discussions of this paper.

SYMPOSIUM ON THE EARLY DIAGNOSIS OF TUMORS OF THE RECTUM AND COLON

An Evaluation of Polyps Detected in 20,847 Routine Sigmoidoscopic Examinations

G. S. WILSON M.D. (*By Invitation*), E. H. DALE, M.D. (*By Invitation*) AND O. A. BRINES, M.D (*By Invitation*), *Detroit, Michigan*

From the Yates Memorial Clinic, Detroit, Michigan.

MANY reports have been published evaluating the incidence and malignant potentialities of colonic polyps, with varying conclusions, depending upon the source of material and method of study. In autopsy specimens this incidence is reported to vary from 2.3 to 69 per cent.[12,21–23,25] The incidence in living patients is reported to range from 1.8 to 17 per cent,[1–5,9,15,16] with the higher figures reflecting a greater proportion of men to women, an older age group, a greater number of patients complaining of symptoms, and in some instances consideration of x-ray studies as well as sigmoidoscopy.

There are relatively few reports dealing with rectocolonic polyps found by routine sigmoidoscopic examination of a statistically significant number of healthy persons of all ages. A unique opportunity is afforded for such a study at a cancer detection center such as the Yates Memorial Clinic, where only presumably asymptomatic persons are accepted for examination.

It is our intention to use the word "polyp" to mean adenomatous polyp or adenoma and not other protrusions of the intestinal mucosa, inflammatory or otherwise, which may be encountered in this area. This understanding is important because of the high malignant potentiality of adenomas in this region, there being no better example of the development of cancer in benign tumors anywhere in the body. It should also be understood that it is difficult to divide sharply adenomatous polyps of the rectosigmoid into benign and malignant groups on histologic examination.

The Yates Memorial Clinic was established in May, 1950, by the Southeastern Michigan Division of the American Cancer Society and is operated professionally by the Wayne University College of Medicine. One of the basic aims of the Clinic is to provide information on the prevalence of malignant and premalignant lesions in residents of the community and to evaluate the effectiveness of various diagnostic procedures in detecting early cancer.

Each patient on entering the Clinic gives a complete history and receives a physical examination which includes pelvic examination in the female with routine Papanicolaou smears of the cervix and vagina. Sigmoidoscopic examinations are performed in every case regardless of sex or age. Complete blood counts and urinalyses are routinely made and biopsy specimens are taken when indicated. Ear, nose and throat examinations with visualization of the vocal cords are made and roentgenograms of the chest are obtained when symptoms warrant. The diagnoses and recommended treatment are not discussed with the patients; rather, these persons are instructed to consult their private physicians to whom the results of the examinations are sent.

From May, 1950, to the end of December, 1954, 20,847 sigmoidoscopic examinations were performed (Fig. 1.), 16,518 (80 per cent) in women and 4,329 (20 per cent) in men. The predominance of women in this survey is probably due to the housewives' easier accommodation to the daytime clinic hours and possibly to the fact that the public is more conscious of cancer of the female organs. In 19,578 (93.9 per cent) cases, patients were examined once (Fig. 2); in 1,041 (4.99 per cent) there

were two examinations, and in 228 (1.09 per cent) there were more than two.

Many cancer detection clinics accept for examination only those patients over a certain age, frequently thirty-five or forty-five,[1,4,5,9,17,18] on the assumption that financial outlay does not justify examining patients in the lower decades, when cancer is less likely to be found. We have thus far made no such age restriction; the present policy of the Yates Memorial Clinic is to accept any asymptomatic patient desiring examination. Most of our patients are between thirty and thirty-nine, with the distribution as seen in Figure 3. Actually 8,967 or 43 per cent of the examinations were performed on patients under forty years of age. (Fig. 4.)

To the best of our knowledge there is no available statistical information as to the success of sigmoidoscopy when measured in terms of the distance to which the sigmoidoscope is inserted into the rectum. We have reviewed 10,000 consecutive sigmoidoscopic examinations and have ascertained that in 99.9 per cent a distance at least 16 to 17 cm. above the mucocutaneous junction was reached. (Fig. 5.) The acute angulation of the rectum with the sigmoid colon at this level probably accounts for the sharp decline of successful examinations beyond this point. Seventy to eighty per cent were examined to the 17 to 18 cm. mark, or well into the sigmoid colon. Only about one-third, however, were examined to 25 cm., or the entire length of the sigmoidoscope.

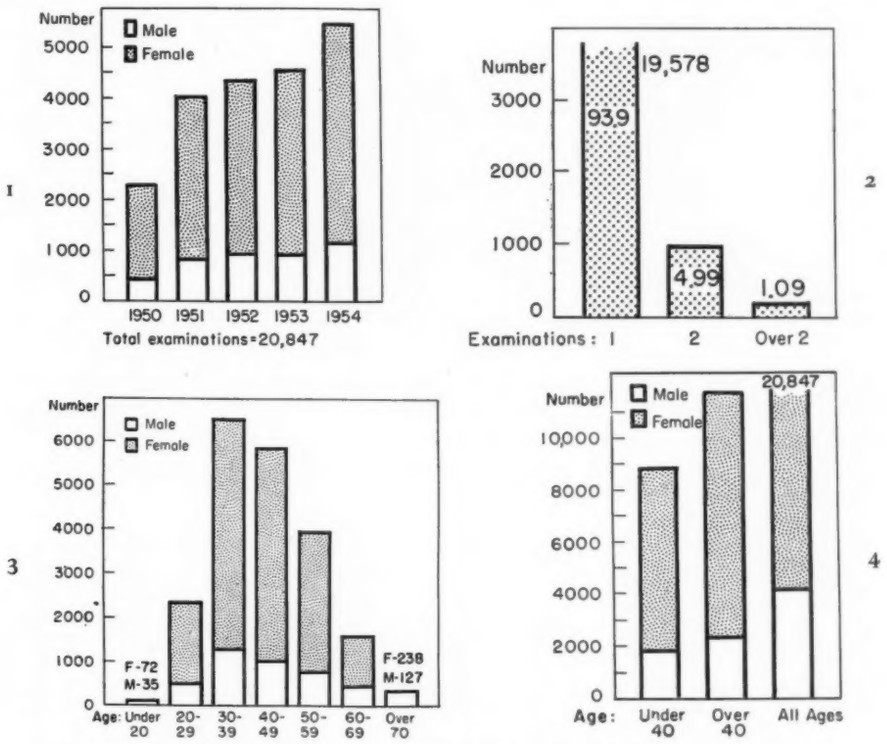


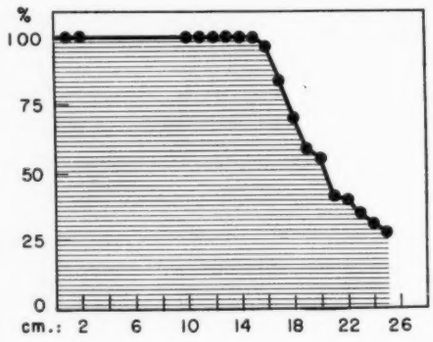
FIG. 1. Sigmoidoscopic examinations (Yates Memorial Clinic, May 1950–December 1954).

FIG. 2. Frequency of repeat sigmoidoscopic examinations.

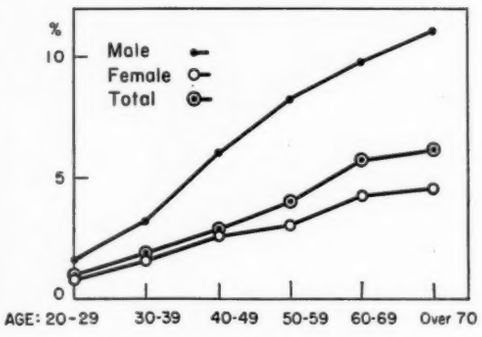
FIGS. 3 and 4. Cancer detection examinations (Yates Memorial Clinic, May 1950–December 1954).

During the course of the 20,847 sigmoidoscopic examinations, 604 patients were found to have rectal or colonic polyps, making an over-all incidence of 2.8 per cent. The incidence was greater in men than in women and increased steadily with age. (Fig. 6.) At what level the frequency of colonic polyps becomes high enough to warrant routine sigmoidoscopy is difficult to determine. Because of the fact that other cancer detection centers have arbitrarily limited examinees to those over thirty-five to forty-five years of age, we have organized our

material into two groups with the age of forty years as the dividing line. The frequency of polyps in men under forty years was 2.62 per cent, whereas in men forty and over the frequency was three times as high, or 7.68 per cent. (Fig. 7.) In women under forty the incidence was 1.42 per cent; in those forty and over the figure rose to 2.8 per cent. The dotted lines in Figure 7 represent the incidence of polyps in all patients of the respective age groups; 1.68 per cent in those under forty and 3.95 per cent in those forty years or over.



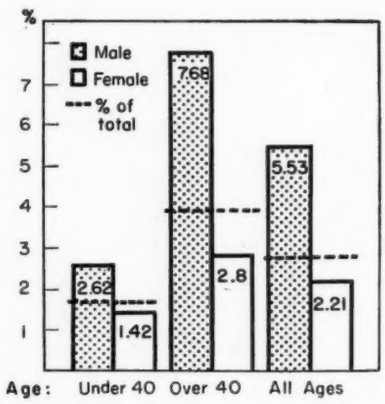
5



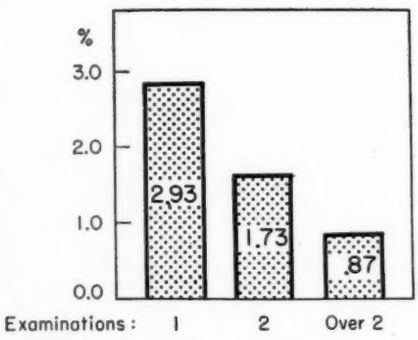
6

FIG. 5. Distance sigmoidoscope was passed in 10,000 consecutive examinations (Yates Memorial Clinic).

FIG. 6. Incidence of rectal polyps (20,847 sigmoidoscopic examinations).



7



8

FIG. 7. Incidence of polyps by sigmoidoscopic examination (Yates Memorial Clinic, May 1950–December 1954). Over-all incidence 2.8 per cent.

FIG. 8. Incidence of polyps in repeat sigmoidoscopic examinations.

The incidence of patients found to have polyps on initial examination was 2.93 per cent. (Fig. 8.) Among the 1,041 patients undergoing a second examination after approximately a year, eighteen additional cases were found, which is an incidence of 1.73 per cent. On subsequent re-examination of 228 patients there were two additional patients with polyps, an incidence of 0.87 per cent. The discovery of polyps on repeat examination of patients in whom no polyps were seen during the initial examination has been noted by other authors.[2,9] The explanation for this phenomenon is either that the polyps were missed on first inspection or, more likely, that they developed between examinations.

More than one polyp was found in 46 of the 604 patients, an 8 per cent incidence of multiple polyps. This provided for evaluation a total of 650 polyps in 604 patients. Of these, the location was definitely known in 603 instances; 45.9 per cent of these occurred between the 11 to 15 cm. mark, 26.5 per cent between 6 to 10 cm., 13.9 per cent between 16 to 20 cm., 11.2 per cent between 1 to 5 cm. and 2.3 per cent between the 21 to 25 cm. level. (Fig. 9.) Only 16.2 per cent of the polyps were discovered above the 15 cm. level. Such a distribution

might well be questioned inasmuch as the most proximal segment of bowel was not examined in all instances due to failure to pass the sigmoidoscope to its full extent. (Fig. 5.) However, considering the number of polyps found in various segments per thousand of successful examinations, the distribution still favors this general level. (Fig. 10.) For example, the 21 to 25 cm. area was successfully examined in 7,372 patients and fourteen polyps were found, or 1.9 polyps per 1,000 examinations. There were 5.63 polyps per thousand in the 16 to 20 cm. area, 13.41 between 11 to 15 cm., 7.68 between 6 to 10 cm. and 3.26 between 1 to 5 cm. The preponderance of polyps in the 11 to 15 cm. area reflects the experience of other investigators.[6,8,10,24]

The incidence of multiple polyps discovered in the living patient has been reported to be from 17 to 35 per cent.[7,10,11,13,14,19,20] Our low incidence of multiple polyps (8 per cent) might be explained by the fact that the sigmoidoscope was our only diagnostic method, whereas other reports sometimes included radiographic studies.

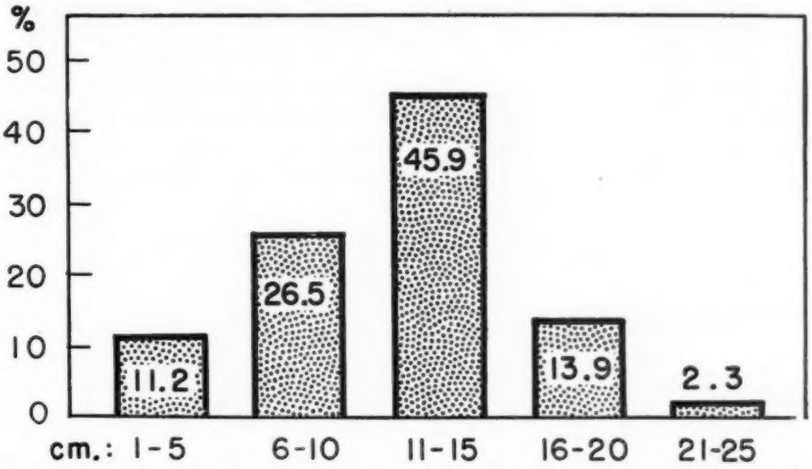
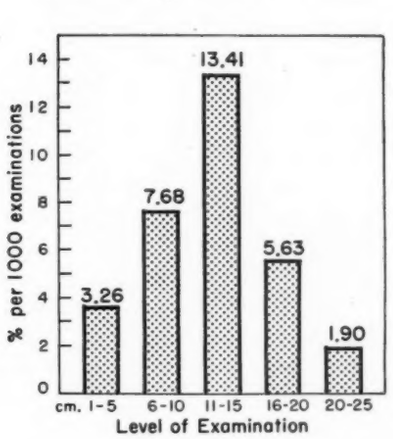
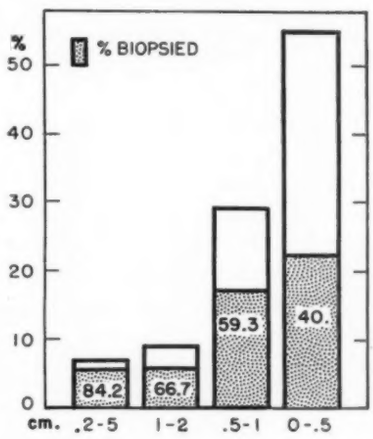


FIG. 9. Location of polyps (Yates Memorial Clinic, May 1950–December 1954).



10



11

FIG. 10. Rate of polyps found per 1,000 examinations at various levels.

FIG. 11. Size of polyps (Yates Memorial Clinic).

The exact size of the polyp was known in 589 instances; 55.2 per cent were 0.5 cm. or smaller in greatest diameter, 29.2 per cent were between 0.5 and 1 cm., 9.2 per cent were between 1 and 2 cm., and 6.5 per cent were between 2 and 5 cm. The shaded areas in Figure 11 represent the percentage biopsied in each group. During the first half of the period under review it was the policy of the Clinic to biopsy all polyps regardless of size. Because of the possibility of completely removing a small malignant polyp by biopsy, thus making it

difficult for proper evaluation by the private practitioner, the policy during the second half of the period was to biopsy only those lesions which would not be completely removed by this procedure. Forty per cent of the polyps under 0.5 cm. were biopsied, 59.3 per cent of the

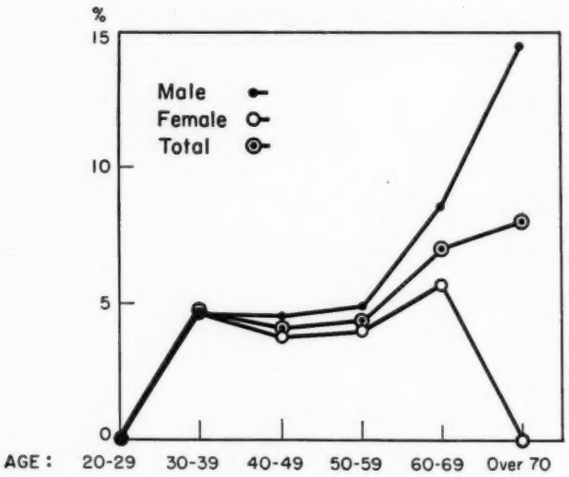


FIG. 12. Incidence of malignancy in rectal polyps.

0.5 to 1.0 cm. group, 66 per cent of the 1 to 2 cm. group, and 84 per cent of the 2 to 5 cm. group. (Fig. 11.)

Our pathologic material was examined by members of the Department of Pathology of Wayne University College of Medicine. A histologic diagnosis of malignancy was made in twenty-nine instances, resulting in an over-all incidence of 4.5 per cent considering all polyps whether biopsied or not. Since only about one-half of the polyps discovered at the Clinic were biopsied, the incidence of malignancy of those biopsied was 8.9 per cent. This coincides very closely with Swinton's[4] finding of 9 per cent incidence of malignancy and Enquist and State's 8 per cent.[9] There was a higher rate of malignancy in male patients than in females and the incidence increased with age. (Fig. 12.) The decline in incidence of malignancy in women over seventy is undoubtedly due to the small number of patients examined (twelve) and is therefore not of statistical importance.

Under the age of forty the incidence of malignancy in polyps was 4 per cent in men and 3.62 per cent in women; over forty years of age, it was 6.31 and 4.11 per cent in men and women, respectively. (Fig. 13.) Considering the series as a whole, the incidence of malignancy in polyps was 5 per cent in men and 4.1 per cent in women.

The malignancy rate increased strikingly with the size of the polyp. (Fig. 14.) In polyps under 0.5 cm. in greatest diameter, 1.5 per cent were proved histologically to be malignant. In the 0.5 to 1.0 cm. group 3.5 per cent were malignant; in the 1 to 2 cm. group the rate was 18 per cent, and in the 2 to 5 cm. group it was 21 per cent.

A follow-up survey of all patients with polyps of the rectosigmoid diagnosed at the Clinic was conducted by first contacting the patient's private physician; if this was unsuccessful, the patient was contacted directly. Successful follow-up was accomplished in 80 per cent of the cases. (Fig. 15.) Of the 490 patients successfully followed up, the polyps were removed in 58 per cent by some accepted method. In 30 per cent the polyp was not removed for reasons which will be mentioned subsequently; in 7 per cent our diagnosis was not confirmed, and in 5 per cent the patient was scheduled for treatment. In the thirty-five cases (7 per cent) in which the diagnosis was not confirmed, repeat sigmoidoscopic examination was known to have been made in thirty instances. In these cases we must conclude that the polyp had been of inflammatory origin and had subsided between the first and second examination or that the polyp was missed on re-examination.

Of the 30 per cent of cases in which the polyp was not removed, 12 per cent of the patients refused surgery (Fig. 16), 11 per cent had other diseases of more immediate concern, and 7 per cent were told by their physician that there was no need for treatment. In this latter group sigmoidoscopic examination was known to have been done in ten cases, the polyp visualized and surgical intervention not advised. In the remaining twenty-six cases we cannot state definitely whether or not subsequent sigmoidoscopic examination was performed.

SUMMARY AND CONCLUSION

1. The value of the present survey lies in the following facts. (a) A large number of examinations (20,847) are available for evaluation; hence a breakdown by age and sex is statistically significant. (b) Patients included in the survey were asymptomatic. (c) Sigmoidoscopic examination was made on all patients regardless of sex or age. (d) Uniform system of recording has made available a large amount of factual information such as the size of the polyps, their

location and the level to which the sigmoidoscope was passed.

2. Six hundred four patients were found to have rectocolonic polyps during the course of

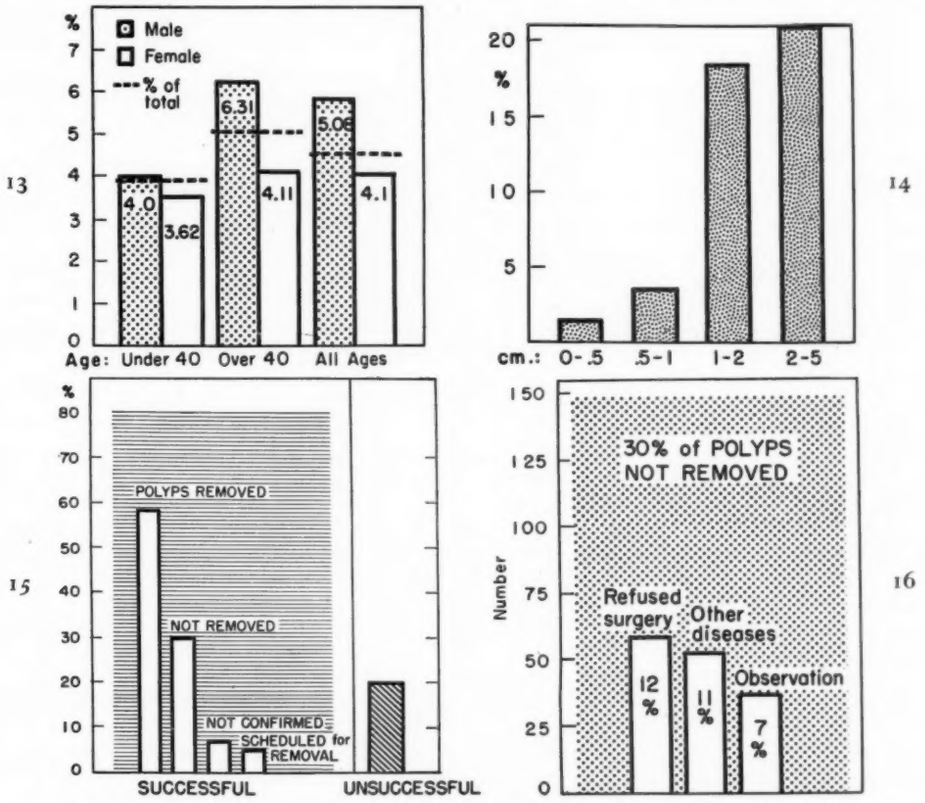


FIG. 13. Incidence of malignancies in rectal polyps (Yates Memorial Clinic, May 1950–December 1954).

FIG. 14. Incidence of malignancy in relation to size (Yates Memorial Clinic, May 1950–December 1954).

FIGS. 15 and 16. Results of follow-up of 604 patients (Yates Memorial Clinic, May 1950–December 1954).

20,847 sigmoidoscopic examinations performed on healthy adults at the Yates Memorial Clinic —an incidence of 2.8 per cent.

3. The frequency of colonic polyps and the incidence of malignancy increased with the age of the patient and was greater in men than in women. The greatest incidence of polyps occurred in men over forty (7.68 per cent); the incidence of malignancy in this same group was 6.3 per cent.

4. There is a relationship between malignant change in a polyp and size of the polyp. In our series between 18 and 20 per cent of all polyps over 1 cm. in greatest diameter were malignant on histologic examination.

5. A successful follow-up of 80 per cent of patients in this type of clinic is considered excellent. There is still incomplete understanding of the premalignant qualities of a rectal polyp by some physicians in the community, as shown by the fact that the private practitioner advised periodic observation in 7 per cent of the patients harboring polyps.

6. We believe that a sigmoidoscopic examination should be performed on all adult patients, particularly over the age of forty, as part of a routine physical examination. It cannot be emphasized too strongly that it is only by the detection of early malignant or premalignant lesions of the colon, followed by their prompt removal, that the cure rate of carcinoma of the colon will be significantly improved.

Acknowledgment: Acknowledgment is made to B. Aubrey Schneider, SC.D., Statistical Research Section, Medical and Scientific Department of the American Cancer Society,

for his able assistance in evaluating and tabulating our clinical material; and to the Staff of the Yates Memorial Clinic, particularly Mrs. Virginia Boesinger, R.N., for their efforts in obtaining follow-up information.

REFERENCES

1. De Muth, W. E., Jr., Cherney, J. P. and Fitts, W. T. Adenomatous polyps of the colon and rectum. A challenge in cancer prophylaxis. *Surg., Gynec. & Obst.*, 94: 195, 1952.
2. Day, E. R., Thomas, G. and Beck, D. F. Cancer detection, an analysis and evaluation of 2,111 examinations. *Am. J. Hyg.*, 52: 344–365, 1953.
3. Morton, P. C. Adenomas of the colon and rectum. Diagnosis and treatment in relation to cancer prevention. *Ann. Surg.*, 138: 92, 1953.
4. Swinton, N. W. Polyps of rectum and colon. *J. A. M. A.*, 154: 658, 1954.
5. Rosenthal, T. and Oppenheim, A. Evaluation of cancer prevention detection centers. *J. A. M. A.*, 155: 538, 1954.
6. Sandusky, W. R. and Parsons, R. J. Adenomatous polyps of the colon and rectum. *Ann. Surg.*, 135: 818, 1952.
7. Van Buskirk, W. C. Polyps of the large bowel. *Ann. Surg.*, 141: 234, 1955.
8. Castro, A. F., Ault, G. W. and Smith, R. S. Adenomatous polyps of the colon and rectum. *Surg., Gynec. & Obst.*, 92: 164, 1951.
9. Enquist, I. J. and State, D. Rectal and colonic polyps. *Surgery*, 32: 696, 1952.
10. Young, V. T. Routine examination of the lower bowel. Results in 500 asymptomatic patients. *Ann. Surg.*, 81: 18, 1951.
11. Christianson, H. W. and Tenner, R. J. Results of sigmoidoscopic examinations at a cancer detection center; a 2 year study. *Am. J. Surg.*, 81: 14, 1951.
12. Helwig, E. B. The evaluation of adenomas of the large intestine and their relation to carcinoma. *Surg., Gynec. & Obst.*, 84: 36–49, 1947.
13. Scarborough, R. A. and Klein, R. R. Polypoid lesions of the colon and rectum. *Am. J. Surg.*, 76: 723, 1948.
14. Buie, L. A., Smith, N. D., Jackman, R. J. and Hill, J. R. Polypoid lesions on the terminal portion of the colon. *J. A. M. A.*, 139: 702–709, 1949.
15. Ortmeyer, M. and Connelly, M. A study of the colon of apparently well women. *J. Nat. Cancer Inst.*, 9: 399–406, 1949.
16. Turell, R. Colonic adenomas. *Am. J. Surg.*, 76: 783, 1948.
17. Deddish, M. Rectal and colonic survey. *J. Am. M. Women's A.*, 3: 138, 1948.
18. Miller, C. J., Day, E. and L'Esperance, E. S. The value of proctoscopy as a routine examination in preventing deaths from cancer of the large bowel. *New York State J. Med.*, 50: 2023, 1950.
19. Fitzgibbon, G. and Rankin, F. W. Polyps of the large intestine. *Surg., Gynec. & Obst.*, 52: 1136, 1931.
20. Swinton, M. W. and Warren, S. Polyps of the colon and rectum and their relation to malignancy. *J. A. M. A.*, 113: 1927, 1939.
21. Atwater, J. S. and Bargen, S. A. The pathogenesis of intestinal polyps. *Gastroenterology*, 4: 395, 1945.
22. Lawrence, J. C. Gastro-intestinal polyps; statistical study of malignancy incidence. *Am. J. Surg.*, 31: 409–505, 1936.
23. Swinton, M. W. and Haug, A. D. Frequency of pre-cancerous lesions in rectum and colon. *Labey Clin. Bull.*, 5: 84, 1947.
24. Buie, L. A. and Brust, J. E. Solitary adenomata of rectum and lower sigmoid. *Tr. Am. Proct. Soc.*, 36: 57, 1935.
25. Lusman, W. Polypi coli. *J. Patb. & Bact.*, 35: 29, 1932.

Exfoliative Cytology in Tumors of the Rectum and Colon

A NEW ABRASIVE BALLOON

CLARENCE C. FULLER, M.D., *New York, New York*

From the Department of Medicine, New York University Post-Graduate Medical School, New York, New York.

EXFOLIATED cells from the lining of the gastrointestinal tract have been used for diagnostic purposes since 1903, first by Dutcher[1] and later by Jürgens (1907).[2] In 1909 Marini[3] diagnosed thirty-two of thirty-seven gastric carcinomas on unstained cells in washings from the stomach. Bahr in 1910[4,5] and Bartlett in 1917[6] used cytologic studies in dysentery. In the same year Wenyon and O'Connor[7] suggested that study of cellular exudates might be of value in conditions other than amebic and bacillary dysentery. In 1940 Bercovitz[8] demonstrated that if pathologic changes occur in the bowel mucosa, cells of various types are present in the discharges; he reported one case of carcinoma of the rectum, one of carcinoma of the splenic flexure and one of polyps in the terminal ileum. All of these showed a heavy cellular exudate which he believed was one of the earliest evidences of pathologic changes in the lower bowel. In 1941 interest in this method of diagnosis was renewed by the work of Papanicolaou,[9] and since then much has been written on exfoliative cytology in the diagnosis of lesions in all parts of the digestive tract. In 1951 Bader[10] recorded 200 cases, using the Papanicolaou staining method, in which smears were made from the rectal washings if the lesion was within reach of the sigmoidoscope, and from colonic washings when the lesion was beyond. She reported nineteen cases proved malignant by biopsy or surgery, of which eighteen had positive or suspicious smears. One reported as a benign polyp was later proved malignant; there were no false-positives.

In 1949 Wisseman, Lemon and Lawrence[11] reported on twenty-eight cases of proved carcinoma in which smears were taken from the lesion or from the discharge. Nine were positive (four in the rectum and rectosigmoid and five in the sigmoid); seven were questionable (three in the rectum and rectosigmoid and four in the sigmoid); twelve were false-negatives (two in the rectum and rectosigmoid, three in the sigmoid, and seven in the ascending and transverse colon were missed).

In 1953 Hecht and Cohen[12] reported the three types of cells usually found in smears from the colon and stated that the criteria for diagnosing carcinoma in these smears are the same as in carcinoma elsewhere, namely: (1) carcinoma cells have a fairly distinct cellular border, (2) vacuolated cytoplasm, (3) greatly enlarged eccentric nuclei, (4) increased amount and heavily clumped nucleochromatin and (5) the nuclei are heavily stained. In five of their positive cases there was no visualization of the lesion by sigmoidoscopy.

In 1953 Rubin et al.[13] reported a detailed study of cytologic diagnosis in the gastrointestinal tract in 300 cases over a two-year period. They stated that in the colon cytologic study is unnecessary in lesions accessible to the sigmoidoscope but is valuable in diagnosing lesions of the distal colon. They made a positive cytologic diagnosis in three cases of carcinoma of the cecum and one of carcinoma of the hepatic flexure. Difficulties were encountered with polyps diagnosed as malignant adenomas, referring to non-invasive histologically malignant polyps. They reported twenty-two benign lesions all correctly diagnosed on the initial cytologic examination; twenty-seven of thirty-three proved malignancies of the colon were diagnosed preoperatively by cytology. They found the cytologic method useful in differentiating benign from malignant polyps and said it may be an aid in cases with persistent occult blood in the stools when all other studies are negative.

CASE SELECTION AND PREPARATION

The present study was undertaken to determine the value of cytologic examinations in

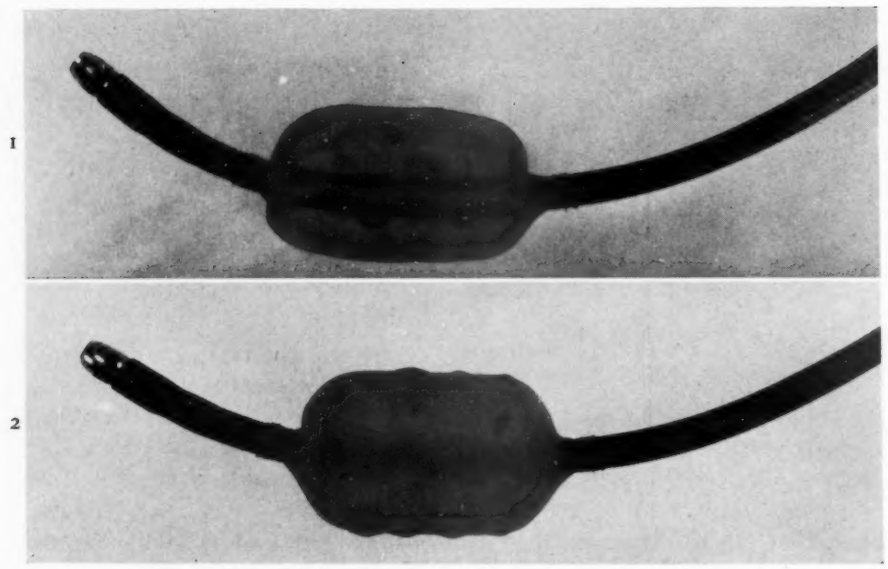


FIG. 1. Partially inflated abrasive balloon (10 cc. air).

FIG. 2. Fully inflated abrasive balloon (20 cc. air).

various disorders of the colon, especially in the early diagnosis of malignancy. No special types of cases were chosen. Mackenzie and Hecht in 1947[14] diagnosed the first case of carcinoma of the rectosigmoid by rectal smear using the Papanicolaou staining technic. From 1947 to 1951 fifty-one gastrointestinal cases were examined. These included eight carcinomas, of which four had positive smear diagnosis, two were suspicious and two were reported negative. Four cases of non-specific diarrhea, fifteen of ulcerative colitis, one of polyp, two of benign growths, one case of diverticulitis, four of rectal bleeding and proctitis, and ten without clinical diagnosis all showed negative smears; two smears were unsuited for staining. No standard technic was used and smears were made in a variety of ways, including specimens on plain gauze, fluid washings, etc.

In 1952 the present study was started and a preliminary report was made in 1954.[15] The majority of smears were made directly from the lesions through the sigmoidoscope. Others were taken using an abrasive balloon, in some cases from the bowel wall above the sigmoidoscope when the lesions were not visible through the instrument. A supply of satisfactory balloons could not be secured for the original tube* and hence not many smears were obtained. However, enough were made to demonstrate that they were entirely satisfactory and in some cases superior to the direct smears. The balloon later described has only recently been obtained and is currently being used.*

Preparation of Patients. In preparation for examination two enemas of normal saline, each of 8 ounces, are given. The first is to be given one hour and the second one-half hour before examination. To avoid irritation of the bowel wall no laxatives of any kind are used.

Examination is made using a standard proctoscope with the patient in the knee-chest position. Direct smears are made with a sponge-rubber swab; cotton swabs are avoided as strands of cotton adhere to the slide. The smears are immediately placed in a fixative solution of equal parts of 95 per cent ethyl alcohol and ethyl ether.

If the lesion is above the sigmoidoscope, the abrasive balloon is used. This pebbled balloon (Figs. 1 and 2) is attached to a double lumen Patton style tube which is 31.5 inches (80 cm.) in length from the metal tip to the syringe connections. The balloon can be partially inflated with 10 cc. of air (Fig. 1) and completely inflated with 20 cc. (Fig. 2.) Each lumen of the tube is connected to a short piece of tubing containing a valve which opens when the

* The tube and balloon used originally was devised by Dr. Richard Ferayorni, Department of Medicine, New York University Post-Graduate Medical School, New York, N. Y.

* The new and currently used tube and balloon was devised by the author, with the help of Mr. Capatch of C. R. Bard, Inc., Summit, N. J., and is manufactured by that company.

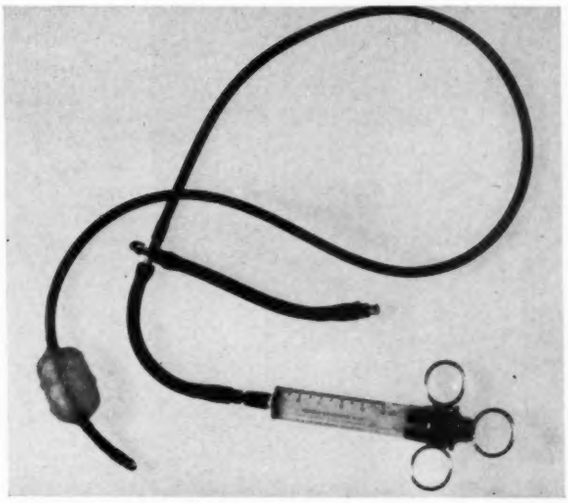


FIG. 3. Abrasive balloon, tube and syringe (attached to lumen for irrigating).

FIG. 4. Rectal polyp (photograph through sigmoidoscope).

syringe is attached and closes when the syringe is removed. The center lumen, to which the syringe is attached in Figure 3, extends through the metal tip and is used for irrigating the bowel to remove any retained material which might prevent contact of the balloon with the lesion; the other lumen is for inflation and deflation of the balloon.

The deflated balloon is passed through the sigmoidoscope the full length of the tube (31.5 inches) or to a point above the lesion if its location has been determined by x-ray. The colon is then irrigated with warm normal saline and the balloon is inflated. It is then gently drawn down to the end of the sigmoidoscope, deflated and pulled through the instrument. Smears are made directly from the balloon and immediately put in the fixative solution. If any resistance is noted when the balloon is pulled downward, it must be deflated until there is no further resistance; otherwise the bowel will be traumatized.

Number of Patients and Results. A total of 103 patients have each received from one to six examinations. Thirty miscellaneous cases were examined and all had negative Papanicolaou smears. Of these, four had normal mucous membranes and there were no cells in the smears; two cases of diarrhea showed no cells and were diagnosed as functional; three cases of constipation showed no cells and were diagnosed as simple constipation without colitis. Six cases of diverticula were examined; three showed no cells, indicating absence of inflammation, and were called diverticulosis; three showed pus cells and the diagnosis of diverticulitis was made. Three cases of "proctitis," three of hemorrhoids and one of ileocecal tuberculosis (postoperative) all showed no cells. Four cases of ileitis showed pus cells. One case of ascaris and giardia infestation and one case of amebic dysentery showed pus cells and erythrocytes. Two cases of scleroderma showed a positive cellular exudate. The remaining seventy-three cases were divided as follows:

Carcinoma: Ten cases were seen, of which five were in the rectum within reach of the sigmoidoscope; all of these had positive smears and the diagnosis was later confirmed pathologically. Of the five remaining cases, two were postoperative rectosigmoid carcinomas with end-to-end anastomosis, one of which still had negative smears seven years postoperatively; the other showed a positive smear four years postoperatively, indicating recurrence. One case of carcinoma of the right transverse colon, one of carcinoma of the hepatic flexure and one of carcinoma of the ascending colon all gave negative smears; the diagnosis was later confirmed pathologically.

Polyps: Twenty-five patients with polyps were examined; of these fourteen (56 per cent) did not have any other lesion but eleven

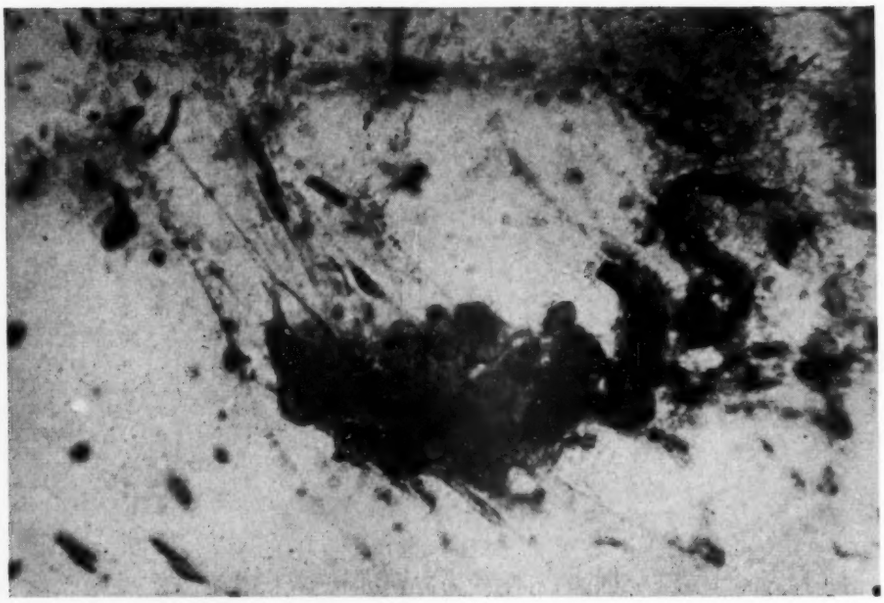


FIG. 5. Smear from polyp (Papanicolaou stain) showing malignant cells.

(44 per cent) had active ulcerative colitis. In the first group twelve (85.7 per cent) had negative smears but two (14.3 per cent) had positive smears (Figs. 4 and 5); these were fulgurated and subsequent smears were negative. In the eleven cases occurring with ulcerative colitis, six (54.5 per cent) had negative smears but five (45.5 per cent) had positive smears; one of these also had two large carcinomas of the rectum. Positive smears from polyps were two and a half times more frequent in patients with ulcerative colitis than in patients without this condition. Polyps occurred in eleven of twenty-one cases of active ulcerative colitis (52.4 per cent) but were not found in any patients in which the colitis was inactive.

Ulcerative Colitis: Thirty-nine cases were seen, eighteen (46 per cent) of which were inactive, and none of these had a positive Papanicolaou smear or showed polyps on examination. In twenty-one (45 per cent) active cases ten (47.6 per cent) had no polyps and had negative smears; six (28.6 per cent) had polyps with negative smears; five (23.8 per cent) had polyps with positive smears, and one of these had two large carcinomas in the rectum. Polyps occurred in eleven (28.2 per cent) of the thirty-nine cases of ulcerative colitis, both active and inactive; five (45.4 per cent) of these, all in active ulcerative colitis, had positive smears—12.8 per cent of all cases of ulcerative colitis.

COMMENTS

Exfoliative cytology is of value in determining the presence or absence of inflammation in various disorders of the colon apart from malignancy.

In those cases with lesions within reach of the sigmoidoscope in which the lesion is clinically malignant it is only a confirmatory test.

It is of value in detecting malignancy in the course of ulcerative colitis, either in the active or inactive stage, with or without polyps. It is of especial value in detecting malignant changes in apparently benign polyps in the preinvasive stage, so that these polyps can be successfully removed.

In the follow-up of patients previously operated upon for malignant lesions repeated cytologic examinations are of value in detecting any evidence of recurrence at any early stage.

SUMMARY

1. The results of Papanicolaou smears in a total of 154 cases of gastrointestinal disorders have been presented.

2. A new tube and abrasive balloon to obtain smears from various levels in the colon has been described.

Acknowledgment: Continuation of this study has been made possible by the Frances Scott Memorial Fund.

REFERENCES

1. DUTCHER, T. B. A study of the cases of amebic dysentery occurring at the Johns Hopkins Hospital. *J. A. M. A.*, 41: 480–488, 1903. Cited by Bahr.[4,5]
2. JÜRGENS. Die Amöben-Enteritis und ihre Beziehungen zur Dysenterie. *Ztschr. f. exper. Path. u. Therap.*, 4: 769–816, 1907. Cited by Bahr.[4,5]
3. MARINI, G. Über die Diagnose des Magenkarzinoms auf Grund der cytologischen Untersuchung des Spülwassers. Eigene Beobachtungen über den normalen und pathologischen Zelleninhalt des Magens. *Arch. f. Verdauungskr.*, 15: 251–267, 1909.
4. BAHR, P. H. Report to the London School of Tropical Medicine on investigations on dysentery in Fiji during the year 1910. *J. London School Trop. Med. Suppl.*, 2: 1–77, 1912.
5. BAHR, P. H. A study of epidemic dysentery in the Fiji Islands, with special reference to its epidemiology and treatment. *Brit. M. J.*, 1: 294–296, 1914.
6. BARTLETT, G. B. Pathology of dysentery in the Mediterranean Expeditionary Force, 1915. *Quart. J. Med.*, 10: 185–244, 1917.
7. WENYON, C. M. and O'CONNOR, F. W. Human Intestinal Protozoa in the Near East; an Inquiry into Some Problems Affecting the Spread and Incidence of Intestinal Protozoal Infections of British Troops and Natives in the Near East, with Special Reference to the Carrier Question, Diagnosis and Treatment of Amebic Dysentery, and an Account of Three New Human Intestinal Protozoa. London, 1917. John Bale, Sons & Danielsson, Ltd.
8. BERCOVITZ, Z. T. Studies in cellular exudates of bowel discharges. 1. Control observations in 1,123 patients, 7 autopsies, and 3 dog experiments. *J. Lab. & Clin. Med.*, 25: 788–795, 1940.
9. PAPANICOLAOU, G. N. and TRAUT, H. F. The diagnostic value of vaginal smears in carcinoma of the uterus. *Am. J. Obst. & Gynec.*, 42: 193–206, 1941.
10. BADER, G. The cytologic picture in rectal and colon pathology. In: Proceedings, Symposium on Exfoliative Cytology, pp. 82–88. New York, 1951. *American Cancer Society, Inc.*
11. WISSEMAN, C. L., JR., LEMON, H. M. and LAWRENCE, K. B. Cytologic diagnosis of cancer of the descending colon and rectum. *Surg., Gynec. & Obst.*, 89: 29–30, 1949.
12. HECHT, E. L. and COHEN, C. The cytologic method in gastrointestinal cancer. *Rev. Gastroenterol.*, 20: 11–20, 1953.
13. RUBIN, C. E., MASSEY, B. W., KIRSNER, J. B., PALMER, W. L. and STONECYPHER, D. D. The clinical value of gastrointestinal cytologic diagnosis. *Gastroenterology*, 25: 119–138, 1953.
14. MACKENZIE, L. L. and HECHT, E. L. A case of carcinoma of the rectum diagnosed by the cytologic method. *Rev. Gastroenterol.*, 15: 915–916, 1948.
15. FULLER, C. C., CLARK, H. E., HECHT, E. L. and COHEN, C. Exfoliative cytology in disorders of the colon. *Cancer*, 4: 86–89, 1954.

Colotomy and Coloscopy in the Management of Mucosal Polyps and Cancer of the Colon

MICHAEL R. DEDDISH, M.D. AND RALPH E. HERTZ, M.D., *New York, New York*

From the Department of Surgery, Colon and Rectal Service, Memorial Center, New York, New York.

THE tendency for colonic polyps to be multiple and the frequent association of benign polyps with colonic cancer have been well known for several years. These facts have been repeatedly demonstrated by clinical observations, studies of surgically excised tumors and by autopsy series. It has also been pointed out that a proportion of colonic cancers arise within benign polyps. The limitations of current x-ray diagnostic technics in the demonstration of polyps less than 1 cm. in diameter has also been shown. It is apparent, therefore, that the management of colonic polyps by simple colotomy and excision or segmental resection of polyps demonstrated on x-ray are approaches which do not permit treatment of the total problem of polyp disease of the colon. The same limitations hold true for segmental resections for cancer of the colon. In these instances the remaining unobserved colonic mucosa can be presumed to be the frequent site of polyps and small cancers. Careful palpation of the colon at the time of celiotomy will add but little to the detection of these small lesions. It was for these reasons that a technic for endoscopic examination of the entire mucosa was devised. This procedure has been designated "colotomy and coloscopy." Previous reports have demonstrated the value of this method in the pick-up of additional polyps and in the prophylaxis of invasive carcinoma of the colon.

TECHNIC OF COLOTOMY AND COLOSCOPY

Colotomy and coloscopy as applied to the management of benign polyps consists of a technic of multiple colotomies with endoscopic examination of the colonic mucosa. A patient should not be considered a candidate for this procedure until a suspected lesion has been demonstrated in more than one barium enema examination. The procedure is also used in conjunction with resection of the colon regardless of whether or not additional polyps have been demonstrated.

Thorough preoperative cleansing of the colon is necessary. A period of five days' preparation is recommended. The essential feature of the preparation is active catharsis which consists of 30 cc. of 50 per cent magnesium sulfate three to four times daily. A liquid diet for forty-eight hours prior to surgery is helpful. Castor oil, 60 cc. given the day prior to surgery, completes the preparation. An antibiotic of the surgeon's choice may be used.

A left paramedian incision is usually adequate. The skin edges are protected from contamination by at least a double thickness of a laparotomy pad, and similar precautions are subsequently taken to protect the viscera at the time of colotomy.

The colotomies are made through the longitudinal bands and carried out in the following sequence: If a lesion has been demonstrated within the left colon, the initial incision should be made directly over its base. The lesion is treated and endoscopic inspection of the remaining left colon effected. If no lesion has been detected in the left colon, the most accessible portion of the sigmoid is used. Orderly inspection of the colonic mucosa should be completed through incisions in the mid-transverse colon and through a slight enlargement of the cecal defect following appendectomy. A low-lying hepatic flexure may allow complete inspection of the right colon through the transverse colon incision. The colotomy incisions are closed by continuous No. 0000 chromic catgut to the mucosa and interrupted No. 0000 silk to the seromuscular layer.

Demonstrated polyps or areas of hyperplasia are removed by suture ligature of the pedicle and excision, by carefully controlled cautery snare electrosurgical technic through the endoscope, or by segmental resection. It must be emphasized that great caution should be prac-

ticed when removing these lesions with the cautery snare. The wall of the colon is thin and will not tolerate an excessive necrotizing effect without perforation. The combination of low intensity coagulating effect and the use of a thin wire snare appears to be the most successful.

TABLE I
COLOTOMY AND COLOSCOPY (1948 TO 1954)

Complete		73
Incomplete		37
Poorly prepared bowel	12	
Previous surgery	12	
Surgeon's choice	13	
Secondary to resection		32
Divided ends only	23	
Subtotal	9	
No polyps found		6

Material. The material for analysis consists of 148 patients who underwent colotomy and coloscopy at the Memorial Hospital in the period from 1948 to 1954. In 116 patients the examination was carried out with the presumptive diagnosis of polypoid disease of the colon on the basis of two or more barium enema studies. In six cases no polyps were demonstrated at operation, so that 110 cases remained for analysis. In seventy-three patients examination of an intact total colon was effected, whereas in thirty-seven patients examination was not total for one of the reasons detailed in Table 1. In thirty-two patients the examination was secondary to resection for carcinoma.

Results. The incidence of detection of additional polyps by colotomy and coloscopy was determined only in those cases in which precise, well supported preoperative statements were available, including at least two barium enema reports. Seventy suitable patients were found in the total coloscopy group, and thirty-five (fifty per cent) were found to have additional polyps (104). In the subtotal coloscopy group there were thirty-three suitable cases, and thirteen (40 per cent) had additional polyps (67). If these groups are combined, additional polyps were found in forty-eight or 46.6 per cent. It was of considerable interest to note that 60 per cent of these additional polyps measured more than 5 mm. in diameter and 30 per cent were more than 1 cm. The largest lesion not detected preoperatively was a 6.5 cm. sessile, papillary adenoma of the caput cecum. The sizes of these additional polyps were as follows: 0 to 5 mm., 40 per cent; 5 to 10 mm., 20 per cent; 10 + mm., 40 per cent.

Thirty-two patients had coloscopy at the time of resection. In twenty-three instances the examination was limited to the available divided bowel ends, and twelve (50 per cent) were found to have additional lesions. Seventeen of these patients had preoperative barium enema studies which showed no polyps. Eight of these were found to have a total of eleven polyps. Polyps were demonstrated by barium enema in six patients, and four of these had additional polyps totalling nine. Only nine patients of this group had one or more additional colotomy incisions and three were found to have polyps (three). Thus 47 per cent of this total group were found to have additional lesions.

TABLE II
DISTRIBUTION OF POLYPS IN TOTAL COLOSCOPY

Site	Per cent
Cecum	5
Ascending colon	10.5
Hepatic flexure	6.5
Transverse colon	14
Splenic flexure	8
Descending colon	14
Sigmoid colon	42

In the total group under study 132 patients had mucosal polyps, which numbered 397. Atypia was found in sixty-six of these polyps in thirty-six patients (27 per cent). *In situ* carcinoma was present in seven patients (5.3 per cent). Infiltrative carcinoma in a polyp was found in nineteen instances (14.4 per cent). In addition to this, in ten patients there were eleven instances (7.7 per cent) of frank carcinoma found at the time of colotomy and coloscopy which had not been suspected on barium enema examination. Only three of these were detected by palpation, the remaining eight being found on coloscopy. Therefore, under the conditions of this study approximately 25 per cent of the entire group were found to have unsuspected cancers and a similar number were found to have one or more polyps showing atypia.

The distribution of the polyps found in this study is shown in Table II. It is likely that the preponderance of left colon lesions is higher here than the actual occurrence rate, as these lesions are more likely to give rise to symptoms than if located more proximally.

The study is of insufficient duration to permit the adequate evaluation of colotomy and coloscopy in the prevention of later polyps and cancers. However, seven patients have been observed to develop polyps in previously studied fields. The time range has been from fourteen to fifty-one months. Five of the seven lesions have developed within three years. The growth of a polyp to 1.0 cm. has been recorded within seventeen months. These findings are in keeping with similar regrowth rates found in several thousand proctosigmoidoscopic examinations done in our cancer prevention clinics.

TABLE III
COMPLICATIONS IN 106 PATIENTS WITHOUT ASSOCIATED RESECTION

1. Deaths (coronary occlusion)	1
2. Peritonitis	18
Mild (temperature 101°F. for 3 days or 100°F. for 4 days, no associated symptoms)	
Severe	3
Temperature 100°–102°F. for 6 days p.o., no localizing signs	1
Temperature 100°–103°F. for 17 days p.o., L.U.Q. rigidity; resolved on antibiotic therapy	1
Pelvic abscess formation and protracted ileus	1
3. Proctracted ileus (4 days or more)	6
4. Abscess	8
Pelvic	1
Superficial wound	7
5. Mechanical obstruction	1
6. Phlebothrombosis	3
With pulmonary embolus	2
7. Pulmonary	4
Pneumonitis	3
Atelectasis	1
8. Miscellaneous	4
Small bowel perforation (Miller-Abbott tube)	1
Post-spinal persistent saddle anesthesia	1
Superficial wound hematoma	1
Temporary traction paralysis of upper extremity	1

Complications. This analysis of complications is limited to the 106 patients who did not have associated resection. We could detect no influence of associated coloscopy upon the complication rate of those undergoing resection.

The complications are listed in detail in Table III. There was one fatality, in a patient with hypertensive arteriosclerotic heart disease who died thirty-six hours postoperatively of coronary occlusion. There were nine additional major complications in eight patients. Three cases of severe peritonitis occurred, with pelvic abscess formation in one patient. Postoperative mechanical obstruction was present in one. There were two pulmonary infarctions secondary to phlebothrombosis. A case of small bowel perforation occurred due to the irrigation of a Miller-Abbott tube balloon with 400 cc. of saline. In one patient persistent saddle anesthesia developed following spinal anesthesia with monocaine.

It will be noted in Table III that eighteen patients ran a low grade postoperative fever with no associated signs or symptoms and were classified as having mild peritonitis. Protracted postoperative ileus occurred in six patients.

The average postoperative hospital stay was eleven days, with a range of from seven to twenty-five days.

COMMENTS

The findings of the study further support previous observations on the tendency of colonic polyps to be multiple. The limitation of current x-ray diagnostic technic is also evident as additional polyps were observed in 46 per cent of the cases. One-third of these polyps measured more than 1 cm. in diameter. Unsuspected carcinoma was found in approximately one-quarter of all patients examined; atypia was also discovered in a similar frequency.

These facts make it apparent that early surgery should be carried out once the diagnosis of a colonic polyp is made. Colotomy and excision or segmental resection is inadequate, and total endoscopic examination of the well prepared bowel is advisable and can be done without undue morbidity.

Simple coloscopy through the divided bowel ends and colotomy and coloscopy at the time of colon resection produced a 47 per cent pick-up rate of additional mucosal lesions. Therefore these examinations should be routinely carried out with resection when the condition of the patient and preparation of the bowel permit.

Colotomy and coloscopy is an efficient diagnostic technic for coexistent polyps and cancers, as well as a valuable prophylactic measure in the prevention of early postoperative development of carcinoma. Its value in prophylaxis is necessarily limited by the natural history of mucosal polyps and cancer of the colon. In this small and recent series new polyps have developed in observed fields in seven patients, and five of these have been within three years.

These rates of polyp development are in keeping with observations at the Strang Cancer Prevention Clinic.

Sessile new growths of more than 5 mm. in diameter and broad-based pedunculated polyps should be treated with segmental resection. Clinically suspicious pedunculated polyps have been submitted for frozen section. Segmental resection has been carried out in a recent series where coexistent cancer was found with a polyp and no instance of metastasis to regional nodes had been demonstrated.

Early diffuse polyposis should be managed according to accepted technics.

Colotomy and coloscopy is indicated in the presence of persistent bleeding with an x-ray diagnosis of diverticulosis of the colon.

SUMMARY

1. Colotomy and coloscopy permits efficient inspection of the colonic mucosa with a low associated morbidity and mortality rate.

2. Lesions other than those detected radiographically were found in 46.6 per cent of 103 patients with the preoperative diagnosis of polyps of the colon.

3. Thirty-nine per cent of polyps found in addition to those demonstrated by radiography measured more than 1 cm. in diameter.

4. Coloscopy or colotomy and coloscopy was carried out in thirty-two patients undergoing resection for cancer and additional lesions were found in 47 per cent.

5. Carcinoma was found in approximately one-quarter of all patients examined by colotomy and coloscopy, and atypia in polyps was found in a similar proportion.

6. In seven patients new polyps have developed within observed fields. Five of these have been diagnosed within three years.

7. Forty-two per cent of polyps found were located in the sigmoid colon.

8. Colotomy and coloscopy practiced with definitive surgical treatment offers improved diagnosis of polyps and cancer. It affords a measure of prophylaxis for cancer within the limitations of the natural history of polypoid disease of the colonic mucosa.

REFERENCES

1. David, V. C. The management of polyps occurring in the rectum and colon. *Surgery*, 14: 387–394, 1943.
2. Deddish, M. R. and Fairweather, W. H. Colotomy and coloscopy. *Cancer*, 6: 1021–1024, 1953.
3. Gerwig, W. H., Jr. and Stone, H. B. Enteric intussusception in adults. *Surg., Gynec. & Obst.*, 76: 95–98, 1943.
4. Helwig, E. B. Benign tumors of the large intestine—incidence and distribution. *Surg., Gynec. & Obst.*, 76: 419–426, 1943.
5. Klein, R. R. and Scarborough, R. A. Diagnosis and treatment of adenomatous polyps of colon. *Arch. Surg.*, 65: 65–70; disc. 70–71, 1952.
6. Marino, A. W. M. Proctosigmoidoscopy, roentgenography and colonoscopy in diseases of the large bowel. *New York State J. Med.*, 55: 668–671, 1955.
7. Monks, G. H. Intestinal localization. *Ann. Surg.*, 38: 574–592, 1903.
8. Norcross, J. W. and Cattell, R. B. The management of gastrointestinal hemorrhage. *S. Clin. North America*, pp. 675–678, 1944.

Roentgenologic Examination of the Rectum and Colon

ROBERT E. WISE, M.D. (*By Invitation*), *Boston, Massachusetts*

From the Department of Radiology, The Labey Clinic, Boston, Massachusetts.

THE value of roentgenologic examination in the detection of advanced malignancies of the colon is well known and accepted. These lesions usually present no significant radiologic diagnostic problem. The very early lesions of the colon, however, remain a diagnostic problem. One of the most difficult problems facing the radiologist today is the localization of a bleeding source presumably in the colon.

A presenting symptom of bright red blood immediately raises one question: Is the source of the bleeding within reach of the endoscope? If it is established that the bleeding is coming from above, there are several possible diagnostic approaches. The first of these is surgical exploration and the second is roentgen study. In our experience it has rarely been necessary to resort to abdominal exploration for localization except in emergencies for massive hemorrhage. We have found that adequate roentgen examination has yielded a high degree of accuracy of diagnosis.

In planning the approach to any bleeding problem, several considerations face the physician. The first of these is selection of types of examination and their proper sequence, and the second is preparation of the patient for these examinations.

PREPARATION

The diagnostic accuracy of either the barium enema or the air contrast examination in our experience is directly proportional to the efficiency of preparation. There is no perfect preparation from the standpoint of either efficiency or comfort. Various laxatives, enemas and low residue diets have been used. Good preparation is uncomfortable frequently but is a prime requisite to accurate diagnosis. It is our present opinion that the patient should receive 1.5 ounces of castor oil the evening before the routine barium enema. This should be repeated the evening before air contrast study. It is frequently beneficial to administer an enema early on the morning of the examination, but the air study should not be carried out until several hours later because of retention of fluid and consequent dilution of the barium mixture.

Admittedly castor oil is frequently ineffective, but by and large it has been found, in spite of its limitations, to be the most effective preparation. A low or non-residue diet for several days before an air contrast examination is often helpful; unfortunately, however, in the average hospital or clinic outpatient practice it is impractical.

One feature of preparation frequently overlooked by both the referring physician and the radiologist is the mental preparation of the patient. A few minutes spent by either the referring physician or the radiologist explaining the difficulty of finding the source of bleeding and also the value of finding it will lead to a happier, more cooperative patient and will eliminate many misunderstandings. All too frequently the patient is given a routine barium enema plus an air contrast examination with the attendant bills, only later to be confronted with the statement that a repeat examination with some additional charge will be necessary. It is perhaps a natural assumption on the part of the patient that an error has been made and he is being forced to pay for it. This could be avoided by a few minutes of discussion beforehand.

SELECTION OF EXAMINATIONS

The usual examinations selected for problems of this type are (1) the routine barium enema examination and (2) the air contrast study. As a rule the routine barium enema should be carried out first, for it is imperative that the entire colon be filled. Whenever pos-

sible, the terminal ileum should be filled as a landmark to assure us that the cecum has been filled. Every radiologist has seen numerous cases in which he has thought the cecum was filled during fluoroscopic examination, as judged by the contour of the lowermost portion of the column of barium, only to find that a few seconds later another segment of colon filled out below what he had originally considered was the cecum. Filling of the terminal ileum, however, will frequently obscure visualization of the sigmoid colon at the time of the air contrast examination. It is not possible routinely to fill the cecum adequately and prevent spilling of barium into the ileum. To attempt to prevent spilling into the ileum is to risk incomplete filling of the cecum. It has been our experience that even advanced lesions of the cecum are more readily visualized on barium enema examinations than by air study, and therefore we consider it imperative to obtain adequate visualization of the cecum with the barium enema prior to air study.

It is for these reasons (i.e., inability to do a proper air contrast examination on the completely filled colon in which the sigmoid area is obscured by the barium-filled ileum, and the necessity for good visualization of the cecum on the barium enema) that the examinations should not be done as a combined procedure. It is true that extra expense and discomfort to the patient are added to have them carried out as separate procedures on separate days, but to do otherwise is dangerous.

The routine barium enema not only will disclose the massive or well advanced tumors but also, with proper technic and care, will frequently lead to the diagnosis of relatively small polypoid lesions. We employ a high kilovoltage technic routinely for all barium enema examinations. For the average patient the kilovoltage ranges between 110 and 120 kvp. With this technic we are able to "see through" the barium column and frequently detect very small polypoid lesions on the "filled" film. This technic does not eliminate the problem of confusing shadows produced by retained fecal material. The after-evacuation film will help differentiate the shadows produced by polyps and by retained fecal material. If one sees a suspicious area on the "filled" film, it may appear as an alteration of the mucosal pattern on the evacuation film. If so, this is further suspicious but not confirmatory evidence of a polyp. If the original suspicious defect is of significant size and has disappeared on the evacuation film (provided a good mucosal pattern was obtained), it usually means that the original defect was due to retained fecal material. It must be emphasized that the mere persistence of the defect does not eliminate the possibility that it represents fecal material.

If the source of bleeding is not disclosed on routine study, an air contrast study must be done.

Many variations of air contrast technic are in use today. We have evolved a technic which we have found to be quite satisfactory. A moderately heavy barium mixture without tannic acid is prepared. The barium used is a commercial preparation containing a suspension agent. The fluid is instilled into the rectum in the usual fashion and passed to the proximal transverse colon. The flow is then stopped. At this time a spot film of the filled sigmoid portion is made. Palpation of the sigmoid, descending and transverse portions is carried out and spot films are made of any suspicious areas.

The patient is instructed to evacuate as much barium as possible in one or two minutes. He is then immediately placed on the table and the remainder of the examination is done. It is very important that the patient be returned to the table immediately after evacuation to prevent desiccation and flocculation of the barium coating the colon. It is usually found that about 25 per cent of the liquid barium remains. With our technic this does not concern us. Air is then instilled until the colon is well distended. This is of great importance since too little air will lead to incomplete visualization and will restrict the flow of barium as described hereafter. The air instillation results in forcing sufficient barium into the right colon to outline it satisfactorily without, as a rule, passing barium into the terminal ileum unless the ileocecal valve is completely incompetent. If instillation of the air does not coat the right colon with barium, manipulation of the residual liquid barium by positioning will usually insure it.

A spot film of the sigmoid distended with air is then made, as well as one of the cecum. Following this, 14 by 17 inch radiographs are made in anteroposterior (supine), posteroanterior (prone), right lateral decubitus, left lateral decubitus, upright and occasionally Trendelenburg positions.

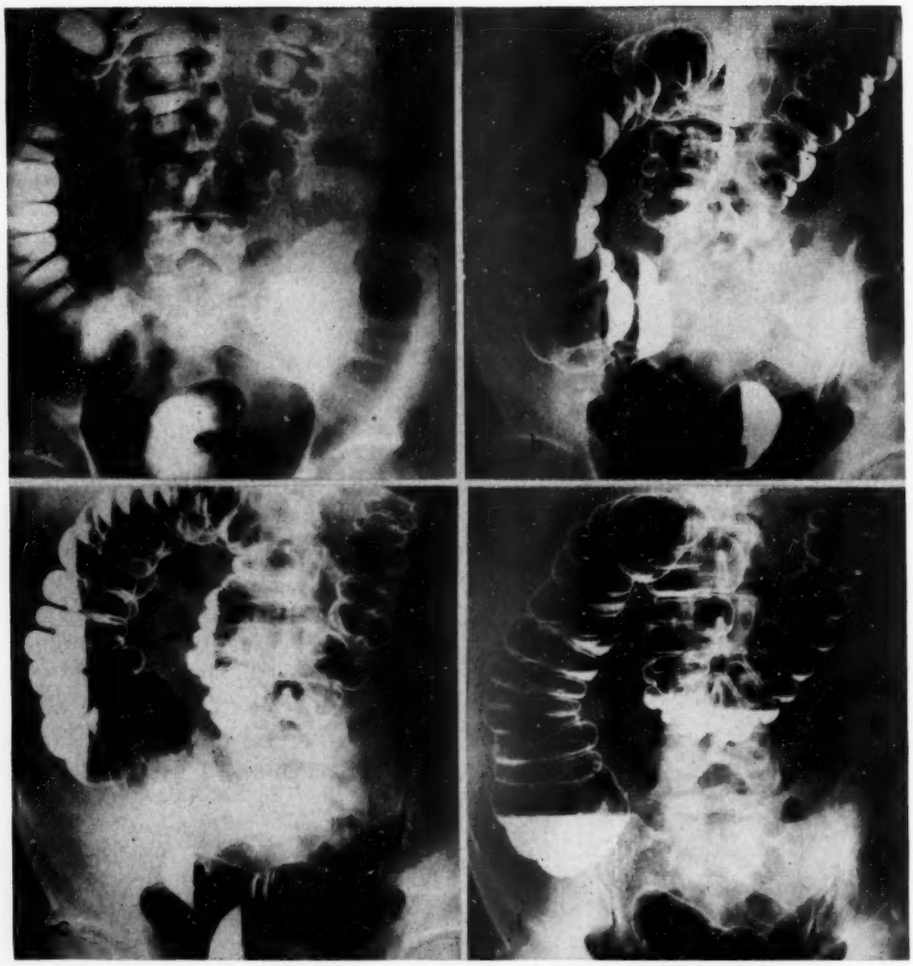


FIG. 1. Routine views employed in air contrast examination. (*a*) Anteroposterior prone view. (*b*) Left lateral decubitus view. (*c*) Right lateral decubitus view. (*d*) Anteroposterior upright view.

With these various positions it is apparent from a study of Figure 1 that although considerable barium remains in the colon, the various positions move it from place to place so that, with all of the films, the entire colon is visualized. This technic has the added advantage that with each movement the fresh barium mixture is washed over the various surfaces of the colon. In addition, as seen in Figure 2*b* and *c*, clumps of barium-covered fecal material frequently are eliminated as possible polyps simply by their mobility.

The presence of diverticula is, all too frequently, a complicating feature of a good air study. There are several ways to differentiate diverticula from polyps. The first is shown in Figure 2, in which the high kilovoltage technic "penetrates" the barium so that the polyp shows itself as a negative shadow. Barium-filled diverticula would not present themselves as negative shadows but would rather produce increased density. The second diagnostic feature is to see the diverticula in profile. (Fig. 3*a* and *b*.) Frequently diverticula will appear as ring shadows, as in Figure 3*a*. This would be indistinguishable from the ring shadow in Figure 2*c*, which represents a polyp. The diverticulum, however, will frequently fill with barium, as in Figure 3*b*. This also permits differentiation since a polyp will not appear as an opaque barium shadow.

Visualization of the right colon has been notoriously difficult owing to the necessity of stopping the flow of barium short of complete filling of the cecum and the great difficulty in clearing the fecal material from this region. With the foregoing technics the right colon can almost always be coated with barium without

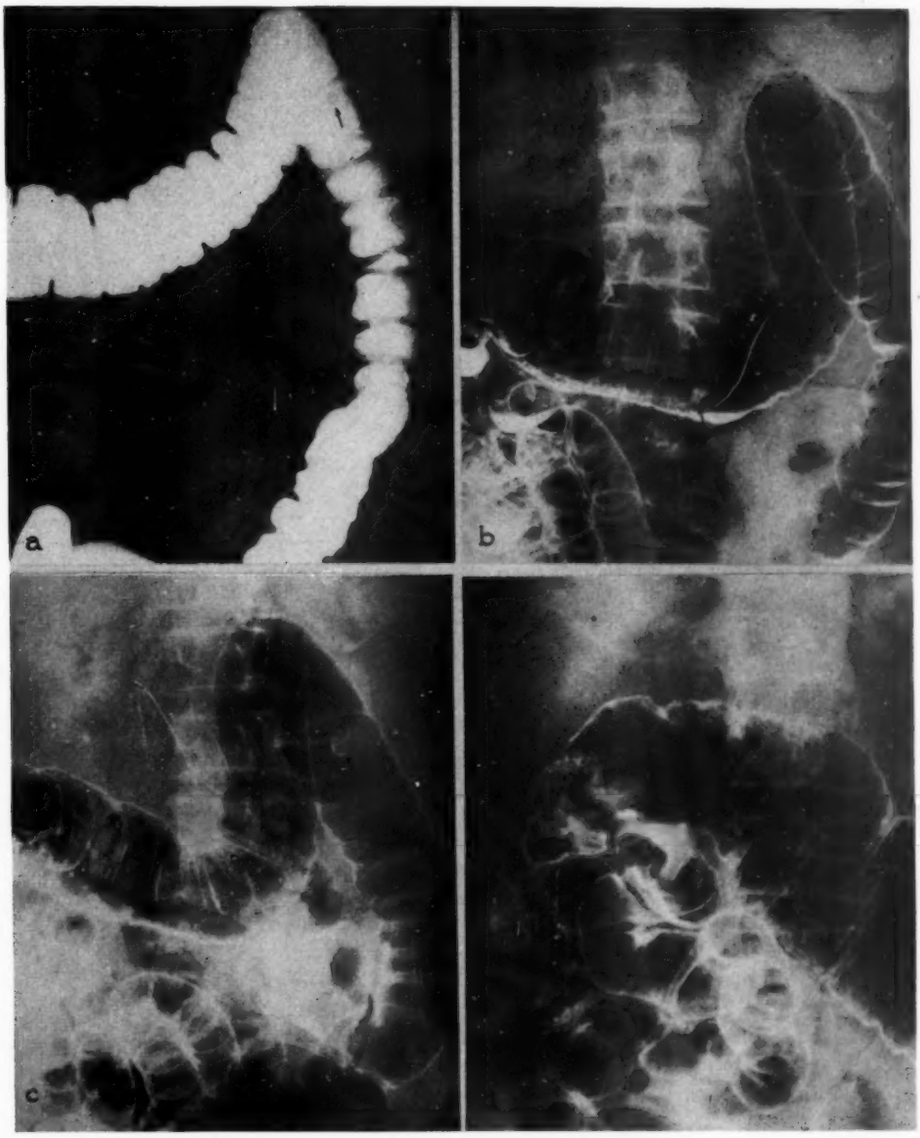


FIG. 2. Patient had undergone a right colectomy elsewhere nine months previously for adenocarcinoma of the ascending colon. She was first seen because of a history of recurrence of bleeding. Proctoscopically it was determined that the bleeding was coming from above the rectum. (*a*) Routine barium enema disclosed a negative shadow visible at arrow. (*b*) Upright air contrast film disclosed two barium-covered ring shadows similar in appearance. Shadow in descending colon corresponds to shadow at *a*. (*c*) Right lateral decubitus film shows persistence of shadow in descending colon but shadow in transverse colon has disappeared. At operation a small benign polyp several millimeters in diameter was found in the upper descending colon. (*d*) Bleeding continued after surgery and three months later air contrast study revealed a recurrent carcinoma at the site of the anastomosis. This was confirmed at operation.

filling the terminal ileum. The fecal residue remains a problem, but by the lateral decubitus technic this objection can frequently be eliminated at least in part by employing the effect of gravity on the distended colon.

Various technics of conducting the air contrast examination are in use. In some the barium and air are instilled successively or alternately at one sitting. Most films are adequate in the proper hands, for it is primarily the care, diligence and skill of the radiologist that produces the best results.

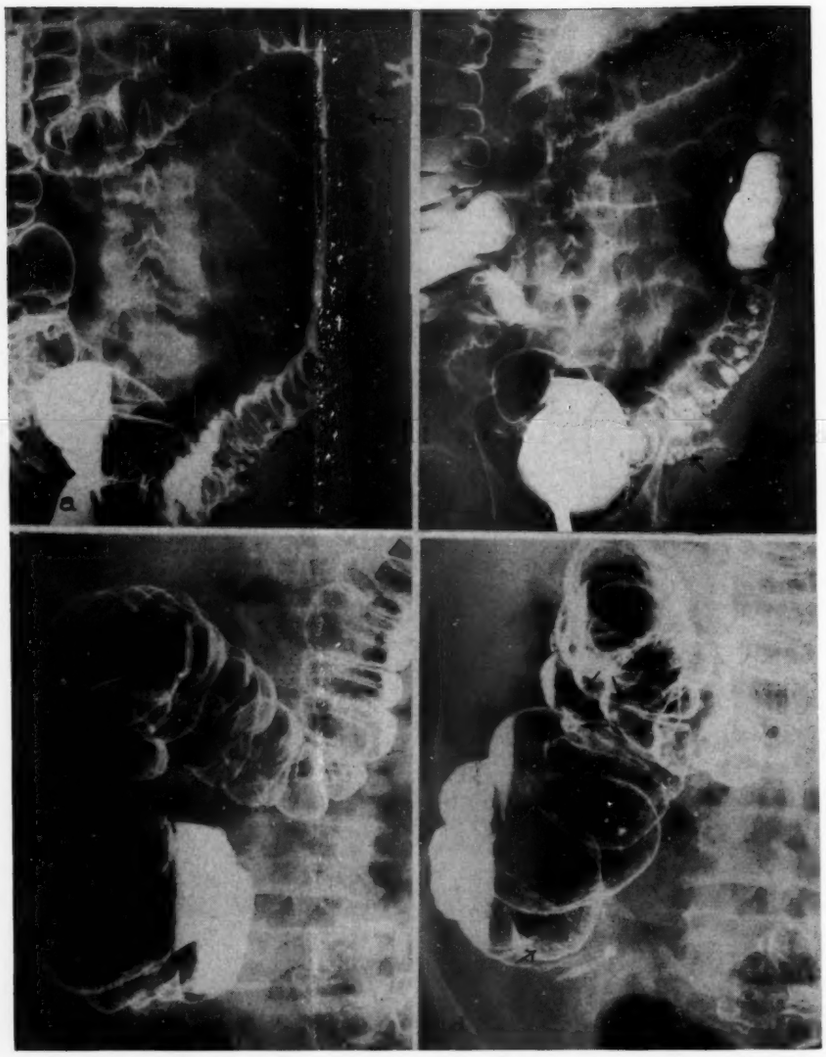


FIG. 3. (*a*) Multiple diverticula; ring shadow at arrow is indistinguishable from ring shadows produced by polyps as in figure 2*c*. Note other diverticula in profile. (*b*) The ring shadow seen in *a* at arrow is now filled with barium, thus differentiating it from a polyp. (*c*,*d*) Air contrast studies showing multiple polyps, some of which measured but several millimeters in diameter. All were benign at pathologic examination.

Air contrast examinations done as part of a routine study simply by instilling "a little air into the colon" are worse than useless, for usually any lesions found by this method are readily apparent on good routine barium enema studies. The examinations do nothing but lead to a false sense of security. Another practice which fortunately has fallen into disrepute is that of dependence upon a six- or twenty-four-hour film after upper gastrointestinal examination for evaluation of the colon. This practice would usually lead only to the diagnosis of far advanced lesions and is mentioned only to condemn it.

LIMITATIONS OF THE AIR CONTRAST EXAMINATION

In spite of the greatest diligence and care there are several limitations to this procedure.

Despite all known preparations, residual fecal material remains our greatest source of difficulty and confusion. The foregoing technic serves to eliminate this factor partially but by no means does it do so completely.

The procedure is both expensive and time-consuming due to the constant attention demanded and to the large number of films which must be employed routinely. In spite of the best preparation and technic it remains

possible to mistake small fecal collections for polyps and all suspected polyps should be confirmed by a repeat air study before operation.

SUMMARY

In our experience the search for early tumors of the colon has been greatly helped by employment of routine barium enema studies carried out with adequate spot film and high kilovoltage technic followed by a thorough air contrast study. With proper technic polyps of only several millimeters in diameter may be detected.

If the initial barium enema and air contrast studies fail to reveal a source of bleeding which has been proved to be coming from above the endoscopically accessible area, the air study should be repeated at least several times. If this fails to reveal the bleeding point, the patient should have follow-up studies at intervals of three to six months until one can be reasonably sure that carcinoma does not exist.

Early detection of cancer or other source of colonic bleeding is costly and somewhat exhausting to the patient. However, with the high percentage of potential cure attendant upon detection and removal of a malignant polyp, the cost is entirely justified.

DISCUSSION OF SYMPOSIUM ON THE EARLY DIAGNOSIS OF TUMORS OF THE RECTUM AND COLON

ROBERT J. TENNER (Minneapolis, Minn.): I would like to bring out the results of our study at the University of Minnesota Cancer Detection Center. Our patients are of the age group from forty-five years and older; consequently our figures will be somewhat different from Dr. Wilson's.

Of 18,000 proctoscopic examinations (total number of patients seen was 7,000), we found adenomatous polyps in 1,600, a little under 10 per cent. These are unpublished figures that I thought would be interesting.

Also another interesting thing I want to mention, which should stimulate us to more thorough and earlier examination, is that to date we have found twenty-eight rectal and colonic cancers. These were not all visualized sigmoidoscopically, but they were found either by sigmoidoscopic examination or x-ray. The distribution was three in the ascending colon, two in the descending colon, eleven in the sigmoid, two in the cecum and ten in the rectum.

The importance of my discussing this paper is that of these twenty-eight cancers, twenty were asymptomatic. Of course these patients are supposed to come to us at or over the age of forty-five with no symptoms, but twenty were asymptomatic. Eight of them had some symptom on close questioning, such as anemia or slight change of bowel habit. All twenty-eight patients have undergone resection.

Of the twenty who were asymptomatic, eighteen of these patients are alive and well today; the two who died did not die from their cancer.

Of the eight patients with symptoms, five are now dead of their cancer.

My discussion is just to re-emphasize the importance of early diagnosis. I very much appreciated Dr. Wilson's article.

GARNET W. AULT (Washington, D. C.): So far we have not yet had any really good controversy. I am for it.

Dr. Wilson, I noticed that in your cancer detection clinic you were able to proctoscope only one-third of your patients to 25 cm. That is a rather low incidence of insertion of the sigmoidoscope or proctoscope for the full distance. I think if we will go over the figures that are available in the literature we will find that in cancer detection clinics the incidence of adenomatous polyps will increase with the frequency with which the sigmoidoscope is passed the full distance. I have no figures to support that right now. Your incidence was 2.8 per cent, which is rather low. The over-all incidence in many reports around the country will be between 7 and 10 per cent. I wonder if physicians in cancer detection clinics, in passing a proctoscope for 25 cm. in only one-third of the patients, are serving patients efficiently. I wonder if incomplete proctoscopy could be improved upon. If patients could be more completely proctoscoped, would the incidence of adenomatous polyps increase beyond 2.8 per cent? I think it would.

Your statistics demonstrate a question of public and physician education. We find that the doctors to whom you sent the patients back advised them to leave the polyp alone in 7 per cent of the cases. I doubt if a cancer detection clinic would be infringing on the doctor's prerogative if he was advised a little more strongly that something should be done about that adenomatous lesion. Dr. Deddish in his presentation has clearly demonstrated that the period of time for the lesion to develop after colotomy and coloscopy is not very long, and that adenomatous polyps can go on to definite malignancy.

Dr. Fuller, I submit to you that cytologic diagnosis is only as accurate as the material submitted and the cytologist. I am wondering, as many others are, if rectums are being removed on the basis of cytologic studies alone? That is a pertinent question, one which we are going to have to answer for all our confreres around the country. If we get

a cytologic diagnosis that a lesion is carcinoma, is that diagnosis based on atypism (or anything you want to call it) or is it based on invasion? We are forced to go right back to the criteria for diagnosing carcinoma. Is it based on cellular structure or on cellular structure plus invasion?

I submit that there are probably a few patients who have had abdominoperineal resection on cytologic studies alone, and I believe that resections performed solely on this basis are being done on insufficient evidence. We all recognize the difficulty in obtaining an accurate diagnosis on biopsy itself, which of course should be more accurate.

Dr. Deddish's article is an excellent example of some basic work that we all should appreciate and take home with us for further consideration. He has shown an incidence of adenomatous polyps of 49 per cent in patients who have had one adenoma. The incidence in patients who had carcinoma was 45 per cent. This indicates that we have a roentgen diagnostic efficiency for adenomatous polyps of approximately 50 per cent.

No polyps were found in six patients in Dr. Deddish's series. We have all probably had that experience. We have had, or may have, a difficult time in distinguishing between a solitary single diverticulum where we are unable to get a good lateral view to demonstrate the presence or absence of a pedicle and have the diverticulum look like an adenoma.

The distribution of the lesions seen on coloscopy was very interesting because for quite some time we have all assumed that in perhaps over 75 per cent of cases adenomatous polyps were located in the left colon. In this series twenty-one appeared in the right colon, fourteen in the transverse colon and 67 per cent in the left colon.

This poses a problem and a question: When do we stop removing polyps by colotomy and start performing either right or left colectomy? It is very interesting to note that eleven patients who have been subjected to colotomy and coloscopy (and we thoroughly subscribe to the procedure, having employed it for four or five years now) have formed adenomatous polyps again. It takes us right back to the preceding question. I doubt if any of us can answer that question at this time, but it is something that should have further consideration.

Dr. Wise, I do not know whether or not you can answer this question. You reported on a patient who had a polyp in the descending colon nine months after a right colonic resection. Did that patient undergo coloscopy at the time of the resection? If the patient did not have a coloscopy at the time of resection, I am sure you will agree that it probably would have been detected by this procedure.

Dr. Deddish has capably demonstrated the value of coloscopy, and the universal adoption of this procedure merits our consideration.

R. A. Scarborough (San Francisco, Calif.): I would like to confine my remarks to Dr. Fuller's paper and Dr. Deddish's report of his experiences.

As I heard Dr. Fuller's paper, which is certainly interesting in that he is doing a sound piece of research investigation, I was reminded of how often in recent years we have had the general problem of subjugating our clinical diagnosis to a laboratory diagnosis, and it bothered me. Perhaps with that particular point in mind I was on the alert for expressions that showed some overextension of authority of the laboratory in making a diagnosis.

For example, Dr. Fuller mentioned six patients with diverticula of the colon on x-ray study. On the study of exfoliative cytology in these patients the diagnosis of diverticulosis was substantiated in three, and the presence of pus cells substantiated the diagnosis of diverticulitis in the remaining three.

I still believe that the differentiation between diverticulosis and diverticulitis is essentially a clinical differentiation, and I hardly think it should be made on the basis of exfoliative cells.

Also, it bothered me when Dr. Fuller said that by this study positive diagnoses of carcinomas of the cecum, hepatic flexure and rectosigmoid were made. I do not think that is the way he meant it, but that is the way I took it, and I am sure he had many other points of clinical investigation which helped him localize the lesion in those particular patients.

Finally, I have in mind a very close personal friend of mine, a doctor world famous for his knowledge of tropical medicine, who for many years studied the stool and the exfoliative cells in the bowel. When he himself developed an abnormality of bowel function, he studied his own stools for nine months. He then consulted another physician and was found to have carcinoma of the transverse colon, from which he died.

I think that although we must maintain an interest and knowledge of the possible value of exfoliative cytology, we must not let it be a substitute for the sound principles of clinical investigation which are always warranted and are most important in order to find the early premalignant lesions of the colon.

Dr. Deddish has been one of the pioneers in the technic of coloscopy, which we now use routinely. In the course of continuing follow-up of all patients who have had one or more polyps of the colon, we find an increasing percentage of patients in whom new polyps and even new carcinomas develop.

This has gradually brought us to the position where we are dissatisfied with our surgical proce-

dure in any polypoid disease of the abdominal colon short of complete abdominal colectomy.

I say that we are dissatisfied. We have not yet had the courage of any conviction that in every patient with adenomatous polyp in the abdominal colon we should perform complete abdominal colectomy with preservation of the rectum and anastomosis of the ileum. Yet in our own minds we are approaching that thought, because as we learn more and more about these adenomatous lesions we realize the high percentage of multiplicity and the high frequency of development of new lesions. We know they can "sneak up on you" and can become malignant before there are any signs or symptoms, or before they can be found by any of our ordinary methods of investigation. Certainly the one sure way of preventing the development of a new adenomatous lesion of the colon is to remove the colon.

Today, from the point of view of surgical technic abdominal colectomy with primary anastomosis is not a difficult surgical procedure. It is not particularly hazardous and we probably will arrive at the conclusion eventually that abdominal colectomy should be performed when an adenomatous polyp is present.

We have had the courage of our conviction to the extent that whenever we find on x-ray or coloscopy a single polyp in any two of the three main segments of the colon, we perform complete abdominal colectomy and anastomosis. In the last few months we have performed about ten of these upon patients in whom, at the time of simple abdominal exploration without coloscopy, we could feel two polyps only; in every instance in the resected specimen there were at least eight. In one instance there were twenty-eight polyps which were not seen on x-ray and could not be felt on palpation.

ROBERT E. WISE (closing): We allow a patient to have more than liquids the day before examination. I think, however, that keeping the patient on liquids the day before would probably help. As I have stated a low residue diet for several days beforehand would probably be of help.

In answer to Dr. Ault's question about the patient who returned nine months later, she was treated elsewhere. I have no idea whether or not she underwent colotomy.

Regarding the comment about diverticula, I think that the high kilovoltage technic would help to differentiate these. Usually, if one sees a diverticulum in profile, the diagnosis is simple. The diverticulum seen "en face" in high voltage technic would show up at increased density in contrast to decreased density that would be seen with a polyp. It is another advantage of high voltage technic which I neglected to mention.

GERALD S. WILSON (closing): I had anticipated possibly five controversial points when I came to this meeting, and three of them have been brought up by Dr. Ault. I appreciated the comments of Drs. Ault and Tenner.

I would like to start with the last question first concerning the 7 per cent of patients diagnosed as having polyps which the doctors did not remove. Our center does cancer detection and does not treat patients. We recommend that the polyps be removed or refer the patients to specialists when we send out a diagnosis of polyps. We cannot enforce the recommendation.

In the follow-up survey, if the polyp has not been removed, we advise that it be eradicated. Before coming to this meeting, I talked to a Detroit doctor, a proctologist, to whom a patient was finally referred after we had written three follow-up notes to the private practitioner suggesting that something be done about the polyp.

The second question concerns the low rate of polyps found in our series—2.8 per cent. It is surprising in reading the literature how similar the incidence of polyps in various series is if the results are arranged in comparable groups, i.e., if the age group, sex and symptomatology are similar. In other words, if you consider asymptomatic men in an older age group, the incidence will be high. Our over-all incidence of 2.8 per cent is still low. We have no reason for it. In males over forty our incidence of polyps was about 7 per cent. The over-all incidence of those over forty is 4.5 to 5 per cent.

One of the reasons Dr. Ault mentioned to explain our low incidence is that we failed to examine the most proximal segment of the bowel in a goodly number of cases. This is true and has been discussed before. We consulted the statistical department of the American Cancer Society, and they figured out the theoretic number of polyps we had missed. If we had examined the whole length, we would have found sixty-five additional polyps, and this would have raised our incidence to 3.5 instead of 2.8 per cent, so that is a factor, certainly. Thank you very much.

Dr. Ault: What were the two we missed?

Dr. Wilson: One of them is, How do you make the pathologic diagnosis, or rather how do you determine malignancy in a polyp?

CLARENCE D. FULLER (closing): The balloon mentioned cannot be purchased as yet. The balloon which I showed you is the first working model but will be available at a later time.

The question was asked, "How do you advance the tube and balloon up the colon in the presence of spastic bowel?" I did not touch on this previously; but if we find a spastic bowel, if we find on sigmoidoscopic examination that we are able to go only up to a point 8, 10 or 15 cm., we stop the examination entirely and have the patient come back at another time after having given antispastic and sedative drugs. Unless there is an

organic obstruction which should be previously determined by x-ray, you will succeed almost invariably and can pass the sigmoidoscope full length. Through it the balloon and tube can be passed as far as desired.

Dr. Reichman asked a good question. Apparently, from one of the questions asked, the impression has been given that cytology is our only method of examination. This is only one part of a complete investigation of the patient. The work has been done principally at the University Hospital in the colon-rectal clinic, which is a combined medical-surgical clinic. Every patient is first examined rectally, sigmoidoscopically, and smears are not always taken. X-rays are then taken; and if there is any reason for it, we have the patient come back for a second sigmoidoscopic examination, taking smears either directly if the lesion is within reach, or using the balloon if it is above the sigmoidoscope.

One point was brought up about the cytologic diagnosis being only as good as the preparation and interpretation. That is absolutely true. If I understood the question correctly (Would you advise abdominoperineal resection on cytological diagnosis only?), the answer is no, I would not.

Only after consultation between the medical and surgical divisions of the clinic is it decided which case must have abdominoperineal resection or colectomy, or what the procedure should be if there is polyposis. If the polyps are few in number and apparently benign and within reach, they are fulgurated; if they are above the sigmoidoscope and removal is necessary, radical resection is indicated or even colectomy if there is multiple polyposis involving most or all of the colon.

That question brought to my mind one very interesting patient. In 1936, when eighteen or nineteen years of age, he was subjected to the first stage of total colectomy by the late Dr. John F. Erdmann because of ulcerative colitis and polyposis which involved the entire colon. A second operation was performed one or two years after the first, and finally the balance of the colon was removed and the terminal ileum anastomosed to the upper end of the retained rectum. The patient was not seen for two or three years, at which time he came to Dr. H. E. Clark (senior surgeon in our clinic) because of very severe anemia. On hospitalization the remaining rectum, about 9 inches in length, was examined and found to be studded with polyps; just within the sphincter there was a large, bleeding, fungating mass. The clinical diagnosis was polyposis and carcinoma, and a Papanicolaou smear was positive. An abdominoperineal resection was performed, and in addition to the carcinoma already seen there was a second one in the upper end of the colon. The patient is now perfectly well, has no anemia and has gained weight.

The point Dr. Scarborough brought up about diverticulitis and diverticulosis goes back to the study of all of the cases with bowel complaints and the loose application of the terms "colitis" or "diverticulitis." Based on the work of Dr. Z. T. Bercovitz, previously referred to, we never use the suffix "-itis" unless we find exfoliated cells either in smears from the bowel wall, smears made from enema returns or from the stool. A simple methylene blue wet smear is sufficient; it is not necessary to do a Papanicolaou stain to establish the presence or absence of exfoliated cells.

I think perhaps I was misunderstood regarding the diagnosis of cancer of the right colon and transverse colon. We have not been fortunate enough to make that diagnosis in our clinic as yet on the basis of cytologic study. The cases mentioned were published in the literature. I remember very distinctly one case of very active ulcerative colitis in an elderly woman which lasted one summer. She recovered from the colitis but became very anemic and there was a change in her bowel habits. She was hospitalized and on x-ray was found to have carcinoma of the right transverse colon, later confirmed by pathologic report; however, smears were negative for malignancy.

With the new rectal tube and abrasive balloon, which will reach 31 inches up in the left colon, I hope to increase the percentage of positive diagnoses. A longer tube, which will reach to the splenic flexure, is in preparation, and this should be of even greater help.

However, it must be remembered that cytologic study is only one part of the complete examination and evaluation of the patient and that it has its limitations. Every patient must have a complete examination, including x-rays and whatever laboratory tests may be indicated, in addition to the cytologic examination.

Michael R. Deddish (closing): I would like to thank Drs. Ault and Scarborough for their comments. They have hit upon something that is confusing me as well: When does one perform right and left hemicolectomy for polyposis? I think the interval these people will go without new lesions developing is going to help us decide which surgical procedure should be employed. I believe from a clinical impression that if the young adult has polyps, whether there are two or three, it is best to perform colectomy. However, in the middle-aged or upper middle-aged individual polyposis seems to be a different type of disease.

Another thing which has fascinated me recently is that I now have eight couples with polyposis of the lower bowel. Curiously enough, two of them have had the lesions in exactly the same areas of their bowel. I wonder if there might not be some environmental factor, such as diet.

Question: Would you give us the name of the snare you now use?

Answer by Dr. Deddish: I think that any snare which you learn to use with a wire that is not too heavy would be satisfactory. We have our own machinist make up these wires, and the average snare is a No. 32 stainless steel wire. We can get them finer or heavier. If the polyp is in the rectal ampulla, you can very well use a No. 28 wire. You want a snare which is very sensitive to the touch, so that you know when you are pulling against the base of the polyp and not pulling against the instrument itself.

The particular instrument I use was made by Downs of London and is a modification of the Yeomans snare. Dr. Frankfeldt has an excellent one, and there are others. I do not think it makes any difference which snare is used as long as you learn how to use it.

Question: If you have a case of rectal cancer and are carrying out a Miles type of resection, do you routinely perform colotomy and coloscopy of the cecum and transverse colon?

Answer: I do not employ it routinely. I have practiced it in most of my young patients. I am certainly doing preoperative barium enema studies a lot more frequently than I did previously. I think we should carry out colotomy and coloscopy routinely. However, this has been a difficult subject to present and accept generally because it entails a great deal of extra operating time, more expense to the patient, etc.; but when we have the fact that polyps are being left in the colon after surgery as now practiced, I do not know how we can avoid this procedure.

Question: If colectomy should be performed for one or two polypoid lesions in the colon, is polyp formation in the ileum any possibility?

Answer: My experience with polyps in the ileum has been very limited. I have seen, I think, about two cases in which polyps did extend for approximately 10 inches in the terminal ileum. Certainly we are all aware of those cases in which polyps have been shown to grow through the entire intestinal tract.

Question: No mention was made of incidence of sessile and pedunculated polyps. Do you have any findings on the relative frequency of sessile and pedunculated polyps? Were any lesions found that were not adenomatous?

Answer: I cannot answer that except to say this: As I mentioned in my paper, the flat lesions seem to be more prevalent in the rectal ampulla and the cap of the cecum, and I only learned about those in the cecal region by doing colotomy and coloscopy. I wonder if it is not a physiologic state where the peristalsis is less in these areas and there is a tendency toward sessile growth. In other areas of the colon, where peristalsis is much more vigorous and when the polyp mass assumes a certain size, a pedicle is usually developed.

Question: How do you feel about treating mucosal excrescences of 2 mm. in diameter? These often disappear. Do you desiccate these when found?

Answer: If they alone are seen, I certainly think that you must consider other things in a differential diagnosis because we know that the submucosal lymph nodes do become enlarged and give you almost an identical appearance; they do not represent a so-called area of hyperplasia which is considered a pre-polyp state of the colon mucosa. However, if areas of hyperplasia are seen in the vicinity of a real adenoma or carcinoma, I certainly think that they should be resected, fulgurated, excised or treated by whatever therapy is indicated.

Question: Would you consider treating by fulguration alone carcinoma located on the posterior wall of the rectum in a woman seventy years of age or older?

Answer: I think some years ago I would have. However, I recently had three people in the hospital who were between the ages of eighty and eighty-five. All of them underwent resections and did much better than some of my younger patients.

Question: Does the recent frequent reporting of pseudomembranous enterocolitis or staphylococcal colitis in any way alter your preoperative preparation of the bowel when you are going to perform colotomy, coloscopy or resection?

Answer: I have used very few antibiotic preoperatively when planning any colon surgery. I either do not use any antibiotic or I give it postoperatively as soon as the patient begins to tolerate something by mouth. This is done with the attitude that perhaps the antibiotics are of more value during the healing stage at the anastomosis than when used preoperatively to obtain mechanical cleansing as well as disinfection of the mucosa.

PAPERS READ BY TITLE

Anal Fissure and Associated Pathologic Conditions in Infancy and Early Childhood

EDWARD F. SLADEK, M.D., *Traverse City, Michigan*

DISEASED conditions of the anus in infants and young children are present with much greater frequency than is commonly suspected. A large percentage of babies are born with some vestige of an incomplete absorption of the proctodeal membrane intervening between the hindgut and the proctodeum. Anal fissure may become a complication of these anatomic defects.

Embryology. Fusion of the hindgut and the proctodeum with rupture and dissolution of the proctodeal membrane usually takes place during the eighth week of embryonic life. The retraction of this membrane to the sides of the newly formed anal canal occurs as a multi-star-shaped phenomenon forming the anal papillae. Interference with this process of fusion may result in abnormal anatomic structures such as enlarged anal papillae, stenosis of the canal with a small non-elastic opening, or an imperforate anus.

Congenital deformities of the anal canal have been found in from 8.7 to 30 per cent of all infants examined.[1–6]

Complications. Such congenital deformities interfere with the free passage of the fecal mass through the anal canal, producing chronic constipation. Trauma, due either to the passage of a single large dry stool or to the irritation of repeated liquid stools, may result in the splitting of the transiderm with occasional prolapse of a papilla, producing an anal fissure. Constant irritation, particularly where the papillae are congenitally enlarged and the crypts are deep, makes the tissues more easily susceptible to infection and inflammation. Cryptitis, infection of the anal glands and abscess formation take place with an eventual anal fistula. General proctitis, occasional pruritus ani or pseudomegacolon may develop when there is a long-existing fissure, particularly in older children.

Symptoms. Constipation, usually colicky in character, or straining at stool may be the only symptoms indicating a possible anal band. With the incidence of trauma and the production of a fissure, grunting and groaning may precede the bowel movement. With its passage a forceful stiffening out of the body is noticed, the back may arch, a tremor of the legs and arms takes place, and the child cries piteously during and just after the bowel action. Bright red blood may accompany each bowel movement, or it may appear intermittently. As the condition progresses a holding back of defecation, restlessness, sleeplessness, irritability, whining and crying spells, refusal to finish a feeding, and failure to gain weight develop. In severe anal disease projectile vomiting near the end of a feeding may appear.

Psychogenic Factors. Through overcontrol and arbitrary attempts toward stool training the child soon develops a tension and resentment against defecation. These feelings are increased by repeated painful bowel movements which produce a dread of the toilet. They also occur in older children as a reaction against a poor or unhappy home, or parental or school authority. The resulting tensional situation creates a hypertonia of the external sphincter muscle, which in turn favors the formation of an anal fissure. The development of anal disease greatly increases these psychogenic factors with an increasing resistance to defecation. Thus a vicious cycle is produced.

Diagnosis. Usually the history suggests a presumptive diagnosis of anal canal disease. Inspection reveals a circumanal redness indicating irritation or inflammation within the

canal. Traction on the skin close to the anus may reveal a sentinel pile, shallow or deep single or multiple fissures, abnormally enlarged papillae, or deep inflamed crypts. Palpation elicits a pain reaction to a degree irrespective of the amount of disease present. There is always some sphincter spasm. Congenital stenosis high in the canal is easily felt as a rubber band sensation, and is particularly significant when it resists dilatation. Occasionally a polyp is felt in the lower rectum. A small-sized Hirschman anoscope is always used for a confirming proctoscopic examination.

Treatment. For the treatment of anal fissure most authors advocate repeated anal dilatations over an indefinite time, mineral oil by mouth and by daily enema, and cauterization with silver nitrate. A few state that surgery should be performed if results are not obtained.

TABLE 1

ASSOCIATED DISEASE IN 300 CASES OF ANAL FISSURE

Associated Disease	No.	Age Group	Greatest Incidence
Congenital deformities:			
Stenosis	84	1 mo.–3 yr.	6 mo.
Atresia with fistula	5	18–24 mo.	Even distribution
Hirschsprung's disease	3	1, 1½, 5 yr.	.....
Cryptitis and papillitis	196	6 mo.–12 yr.	2 yr.
Mucosal prolapse	91	1 mo.–4 yr.	4–12 mo.
Abscess and fistula	27	3 days–10 yr.	Even distribution
Pruritus ani	10	5–12 yr.	6–8 yr.
Internal hemorrhoids	9	4–12 yr.	7–8 yr.
External hemorrhoidal congestion	60	1 mo.–4 yr.	6 mo.–2 yr.
Acquired megacolon	4	9 mo., 2, 5, 7 yr.	.....
Polyp of rectum	11	1–3 yr.	Even distribution

ANAL FISSURE

Schapiro[8] and Mentzer[12] both reported anal fissure in 25 per cent of their pediatric proctologic patients. Apley[9] found anal fissure present in all thirty cases referred to him for treatment of chronic constipation. Other reports have also stressed the presence of fissure and its treatment.[1,3,5,7,10,11]

In the series reported herein 206 females and 94 males, a total of 300 infants and young children between the ages of three days and twelve years, were surgically treated for anal fissure. Seventy-three had received previous medical treatment. In most instances the fissure was associated with other anal disease.

An analysis of the number of congenital deformities, the complications and the resulting disease conditions occurring in this series, together with the age incidence, are given in Table 1.

It is my belief that the vicious cycle and the psychogenic impact must be interrupted. In addition, all local disease must be completely corrected. This is best accomplished by three or four days of hospitalization, administration of a general anesthetic, injection of a long-lasting regional anesthetic and thorough surgical correction of the existing disease conditions.

A minimal amount of general anesthetic is used for the surgical procedure, either intratracheal nitrous oxide and oxygen or drop ether. A single injection of 3 to 5 cc. of a long-lasting local anesthetic is started 2 cm. posterior to the anus, placing one-third deep into the sphincter muscle area and the remainder laterally on both sides. The immediate effect of this injection is a profound relaxation of the sphincter and the anal canal. The delayed effect is an analgesia which reduces the pain and the fear of a bowel movement.

Deep fissures are excised *in toto*, shallow ones incised, enlarged papillae removed and deep infected crypts drained by incision. Structures causing stenosis are incised in two or three lateral areas so as to eliminate postoperative contracture. Finally partial posterior sphincterotomy is performed. When excessive mucosal prolapse is a factor, linear electrocauterization is an additional procedure. All wounds within

the canal are drained out onto the skin by incision. Only occasionally are sutures required to control bleeding. A thin strip of gauze is inserted into the canal and a pressure dressing applied.

Postoperative Care. Penicillin, zymenol® (two teaspoonfuls twice daily) and a regular diet are ordered. The index finger, well lubricated with furacin® ointment, is inserted into the anal canal daily and this ointment on gauze is applied continuously to the area. Healing of the incisions is rapid.

The patient is sent home on a general diet with increased fruit juices. Zymenol is continued twice daily for two weeks and then reduced to once daily for another two weeks. After this it is given only when dry stools are encountered. Phenobarbital, $\frac{1}{8}$ gr., and atropine, $\frac{1}{1000}$ gr. three times a day, are ordered for a three-week period.

It is gratifying to note the universal and often dramatic change in the personality of these patients as a result of the correction of their anal disease.

CONCLUSIONS

Rectal disease can and frequently does occur in infancy and early childhood. A fissure may be a complication of congenital or other diseased conditions of the anal canal. It is suggested that more interest be shown and that a more radical approach be given to the problem of anal disease in infants and young children.

REFERENCES

1. Harris, L. E., Corbin, H. P. F. and Hill, J. R. Anorectal rings in infancy; incidence and significance. *Pediatrics*, 13: 59–63, 1954.
2. Zahorsky, J. Rectal stenosis in infancy. *Arch. Pediat.*, 53: 187, 1936.
3. Coleman, J. M. Congenital fibrous bands in the anorectal line, a possible etiologic factor in colic and constipation. *Texas State J. Med.*, 44: 454, 1948.
4. Libart, J. Congenital anal stricture. *J. Pediat.*, 35: 180, 1949.
5. Brown, S. S. and Schoen, A. H. Congenital anorectal stricture. *J. Pediat.*, 36: 746, 1950.
6. David, V. C. and Gilchrist, R. K. In: Nelson Loose-leaf Surgery, vol. 5, pp. 141–142. New York, 1949. Thomas Nelson & Sons.
7. David, V. C. Surgery of the rectum and anus. In: Lewis' Practice of Surgery, vol. 7, chap. 6, pp. 1–7. Hagerstown, Md., W. F. Prior Co.
8. Schapiro, S. Applied anatomy of infants and children in proctology. *Rev. Gastroenterol.*, 15: 307, 1948.
9. Apley, J. Anal fissure in children. *Practitioner*, 172: 171–173, 1954.
10. Kallet, H. I. Constipation of infancy: rectal factor. *Am. J. Dis. Child.*, 45: 1221, 1933.
11. Patton, E. F. Proctologic problems of the pediatrician. *J. Pediat.*, 27: 532, 1945.
12. Mentzer, C. G. Pediatric proctology. *South. M. J.*, 41: 798, 1948.
13. Fansler, W. A. Anal fistula and abscess. *Am. J. Surg.*, 56: 144, 1942.
14. Turell, R. Pediatric proctology. *Am. J. Dis. Child.*, 79: 510–538, 1950.
15. Brennemann, J. Simple congenital anorectal stricture with megacolon in early infancy: report of six cases. *J. A. M. A.*, 89: 662, 1927.
16. Lehman, E. Psychogenic incontinence of feces in children. *Am. J. Dis. Child.*, 68: 190, 1944.

Anorectal Fistula

GORDON BUNNEY, M.D., *Sacramento, California*

ANORECTAL fistulas are often described as being incurable without producing incontinence. These fistulas will be discussed as to etiology and surgical treatment.

A fistula is defined as a granulation lined tract extending between a hollow viscus and the skin, or between two hollow organs. It is customary to name all organs penetrated by the fistula. Thus the term anorectal fistula should only be used to designate those fistulas with an internal opening in both the anal canal and the rectum. The anal canal should be interpreted as extending from the anal verge to the anorectal muscular ring formed by fusion of the pubococcygeus muscle to the longitudinal muscle posteriorly and laterally, and the deep external sphincter anteriorly. It follows that an anorectal fistula must have an internal opening above all anal sphincters.

Anorectal fistulas have a primary opening at the base of a crypt in or near the posterior midline. They begin as an infection of an anal gland the duct of which perforates the circular and longitudinal muscles. Anorectal fistulas and anal fistulas involving the ischiorectal fossa both start in this area. This coincides with studies which show this to be the area in which deep anal glands appear most frequently.[1]

The infection presumably extends between the trabeculas of the pubococcygeus to form an abscess above the anorectal line. These abscesses are in the supralevator space, which is bounded superiorly by the pelvic fascia, medially by the longitudinal muscle and inferiorly and laterally by the levator ani. It is normally not a true space, but rather a plane of cleavage which may be distended by an abscess. The infection may extend to either or both sides of the rectum. It may also extend posteriorly between the sacrum and pelvic fascia simulating a retrorectal abscess.[2] The fact that it may extend above the tip of the finger is misleading, but these abscesses seldom if ever penetrate the pelvic fascia into the pelvirectal or retrorectal space.

Supralevator abscesses are able to penetrate into the rectum without entering the pelvirectal space because the pubococcygeus muscle is intimately adherent to the lateral walls of the rectum and does not lie as a diaphragm across the pelvis as is usually shown.

It is recognized that infections from the sigmoid, terminal ileum and the pelvic organs may penetrate the pelvic fascia from above to form perineal fistulas.

Courtney[3] described abscesses situated in a space he named the posterior levator space. He described this space as being situated between the inferior and superior layers of the levator and bounded medially by the longitudinal muscle layer of the rectum, above and behind by the ileorectococcygeus, and laterally by the superior layer of the levator. Below is the coccygeal, muscular raphe, and to the side the inferior layer of the levator. I have drained abscesses in this area, but they have all proved to be associated with infections extending into the ischiorectal fossa in the usual manner. It is believed that these abscesses were between the pubococcygeus and puborectalis muscles.

Miles[4] described anorectal fistulas due to abscesses in the pararectal space between the fascia propria of the rectum and the longitudinal fibers. He believed these fistulas were always due to a lesion in the rectum or to puncture of the rectal wall by a foreign body, and stated that they passed downward through the levator to an external opening or to an internal opening in the midline posteriorly between the internal and external sphincters. It was Miles' belief that such abscesses never penetrate the pelvic fascia into the pelvirectal or retrorectal space. He was apparently describing the same type of abscess and fistula as that under discussion, but believed the infection spread downward instead of upward.

I have operated upon four patients with anorectal fistulas in the past five years. Two of these patients had deep ischiorectal or supralevator abscesses incised on the opposite side from that in which the rectal opening was found at later fistulotomy. Both patients denied

any previous symptoms suggesting ischiorectal abscess. The most likely explanation seems to be that they had had previous supralevator abscesses which drained into the rectum before severe symptoms appeared and these abscesses were either unnoticed or forgotten.

One patient with an anorectal fistula had been operated upon several times but the usual distribution of fistulous tracts commonly seen in a posterior or horseshoe fistula still remained. The rectal opening was at the end of one of the lateral extensions.

One fistula followed incision of a bilateral ischiorectal abscess by a very competent surgeon. A probe in the left external opening dropped straight into the rectum. It is considered unlikely that this surgeon created the rectal opening.

All four of these cases were typical posterior horseshoe fistulas with anal openings in crypts at or near the posterior midline. The tracts penetrated the internal sphincter, extended upward between the longitudinal muscle and the external sphincters, curved around the anorectal ring and then extended laterally for about 3 cm. near the transverse anal line. When these tracts extended into the rectum, it was at this point. Why this should be true is a matter of conjecture. Perhaps this is a weak area in the muscular diaphragm between the pubococcygeus and ileococcygeus muscles. This is also the area to which most horseshoe fistulas extend. It is possible that supralevator abscesses frequently form but drain through the ischiorectal fossa without the involvement of the supralevator space being recognized.

One characteristic noted was that the rectal opening was always marked by a small polypoid growth. These were reported by the pathologist as being granulomas. They are not pathognomonic of the rectal opening of an anorectal fistula however, for they are sometimes seen at the rectal opening of a submucosal fistula. It is worth while to remember that when a small polyp is palpated in the rectum in the presence of a deep anal fistula, a careful search should be made for a submucosal or anorectal fistula.

SURGICAL TECHNIC

The internal anal opening is often difficult to locate either by palpation or with a probe. Therefore, the operation is usually begun by inserting a probe through an external opening in the skin. The tract will be found to extend parallel to the anal canal to the levator ani. The fistula then makes at least a 90 degree turn medially and slightly posteriorly. It is necessary to make a deep backcut in order to follow this turn with a probe. The probe is then inserted along the fistula and the tract is laid open in stages until the midline is reached. The same procedure is then carried out on the other side if there are two external openings. During this process all attachments of the superficial external sphincter extending posteriorly to the coccyx or skin are severed. The anus is not appreciably displaced anteriorly because the anococcygeal raphe holds the anal canal in place. This attachment also is not essential to anal continence.

The next step is the incision of all sphincter muscle overlying the extension of the tract into the anal canal. This incision is through the subcutaneous, superficial and deep external sphincters and probably at least part of the puborectalis. The tract is thoroughly curetted and the tissue examined pathologically. If there are any extensions from the main tract, their openings appear as dark dots against the white fibrous surface of the fistula.

Exploration of these dark areas with a tiny silver lachrimal probe will reveal branches from the main tract that might have been missed. The fibrous base of the fistula is left intact. Examination of the rectum at a later date will show that the firm fibrous tissue is apparently absorbed or converted to a softer tissue.

The total thickness of the muscle and other tissues left forming the anorectal ring is only about 5 to 6 mm. Since the puborectalis muscle alone is usually at least this thick the conclusion is that anorectal and deep anal fistulas frequently curve anteriorly between the puborectalis and pubococcygeus muscles. If this is true, the ring formed by the fusion of the pubococcygeus to the longitudinal muscle plays a greater part in maintaining continence than has been previously believed.

At this point the entire fistula has been converted to an open wound except for the part extending through the levator ani into the rectum. It has been recommended that a seton be passed through the fistulous opening and around the anorectal ring, the encircled tissue to be cut at a later date. Since setons result in fibrosis and do not prevent incontinence if the

anorectal ring is divided,[5,6] this maneuver does not appear either necessary or justified.

In order to obtain a satisfactory cure, the fistulous opening in the rectum must be replaced by healthy mucosa and the anorectal ring left intact. This can be accomplished by using the technic previously described by Gant[7] in the treatment of rectovaginal fistulas. A flap of mucosa and submucosa is started at the anorectal ring and freed beyond the rectal fistulous opening. It is then brought down and the portion containing the fistula amputated. The flap must be freed sufficiently high so that the edge can be sutured to the anorectal muscular ring without tension. Interrupted sutures of No. 00 chromic catgut are used to approximate the mucosa to the muscular ring. The operation is completed by the removal of hemorrhoids or other redundant tissue which might fall into the wound and prevent proper healing. Careful saucerization of the wound is then performed. A good rule to follow is to have the outside skin edges at least as far apart as the wound is deep. The wound should be planned in such a way that the cavity will be filled with granulation tissue at the time the epithelium grows across the wound. It is surprising how little deformity or loss of control follows this extensive surgery if the operation is planned correctly.

Vaseline gauze is placed in the wound. This is removed the next day and sitz baths are begun. No pre- or postoperative antibiotics are used. The patient's bowels move by the third postoperative day and he is allowed to leave the hospital. Postoperative care consists in making sure that the wound does not bridge. This is prevented by careful examination of the wound twice a week and separation of adherent edges with the finger if necessary.

SUMMARY

Anorectal fistulas start with infection of the anal glands at or near the posterior midline. The infection extends superiorly between the longitudinal muscle and external sphincters and penetrates the levator ani to form an abscess in the supralevator space between the levator ani and the pelvic fascia, after which it perforates into the rectum. A satisfactory technic for the cure of this condition is outlined.

REFERENCES

1. Kratzer, G. L. and Dockerty, M. B. Histopathology of the anal ducts. *Surg., Gynec. & Obst.*, 84: 333–338, 1947.
2. Wilson, E. Anal and rectal abscesses and fistulae. *M. J. Australia*, 2: 237, 1954.
3. Courtney, C. The posterior levator space. *Tr. Am. Proc. Soc.*, p. 450, 1946.
4. Miles, W. E. Rectal Surgery, 2nd ed., p. 39. London, 1944. Cassell & Co.
5. Milligan, E. T. C. and Morgan, C. N. Surgical anatomy of the anal canal, with special reference to anorectal fistulae. *Lancet*, 2: 1150, 1934.
6. Gabriel, W. B. The Principles and Practice of Rectal Surgery, 4th ed., p. 211. London, 1948. H. K. Lewis & Co.
7. Gant, S. G. Diseases of the Rectum, Anus and Colon, vol. 1, p. 373. Philadelphia, 1923. W. B. Saunders.

Collective Review of Endometriosis of the Colon

GUY L. KRATZER, M.D. AND EUGENE P. SALVATI, M.D. (*By Invitation*), *Allentown, Pennsylvania*

From the Department of Proctology, Allentown Hospital, Allentown, Pennsylvania.

A RECENT case depicting a constricting lesion of the lower sigmoid colon which at exploration presented the clinical picture of cancer but on pathologic examination after radical resection proved to be an endometrioma stimulated our interest in the differential diagnosis of this lesion. Consequently a statistical study was made of all cases of endometriosis seen at the Allentown Hospital from June, 1940 to September, 1954 inclusive.

HISTORICAL REVIEW

Rokitansky, in 1860, was the first to report a case of an endometrioma of the colon.[2] Meyer, in 1909, described an endometrioma which resulted in intestinal obstruction.[10] Polster, in 1926, reported eighty cases of endometriosis with bowel involvement.[2] Cattell,[1] in 1937, reviewed 104 cases of endometriosis found at the Lahey Clinic, of which seventeen involved the sigmoid and rectum. Twelve of the latter group caused intestinal obstruction.

In a study of 117 cases of endometriosis Jenkinson and Brown[3] found that forty-seven cases involved the rectosigmoid and of this number twenty-one produced signs of obstruction. A total of 317 cases of endometriosis were reported by Thierstein and Allen,[4] fifty-three of which involved the large bowel. From the files of the Mayo Clinic McGuff[5] reported forty-eight cases of endometriosis, sixteen of which demonstrated intestinal obstruction.

PRESENT STUDY

A group of 225 cases of endometriosis diagnosed by laparotomy were collected at the Allentown Hospital. Seventy-seven (34.22 per cent) involved the sigmoid colon and rectum. This group was studied for type of involvement. In forty-four cases (19.55 per cent) the sigmoid colon and rectum were adherent to the posterior portion of the uterus. In fifteen cases (6.66 per cent) the sigmoid was adherent to the left tube and ovary. In thirteen of the cases (5.77 per cent) endometrial implants were present on the large bowel. In four cases (1.77 per cent) there was an endometrioma of the bowel, in two of which (.9 per cent) signs of intestinal obstruction were present. (Table I.)

TABLE I
ENDOMETRIOSIS
STUDY OF 225 CASES

Uterus, tubes, ovaries	148 (65.78%)
Total number with bowel involvement	77 (34.22%)
Sigmoid and rectum to uterus	44 (19.55%)
Sigmoid to left tube and ovary	15 (6.66%)
Endometrial implants on bowel	13 (5.77%)
Endometrioma of the bowel	4 (1.77%)
Appendix to right ovary	1 (0.44%)

The percentage of endometriosis with bowel involvement found in our series (34.22 per cent) compares favorably with that in the literature. It is interesting to note that in forty-four of the cases the bowel was adherent to the uterus. Thus this appears to be a very common finding. According to the literature approximately ninety cases of endometriosis have been reported in which there was some degree of intestinal obstruction.[1–14] Our study adds two cases. It is readily seen that the problem of endometriosis is one which every proctologist will eventually meet. Jenkinson and Brown[3] report that 15 per cent of all women have endometriosis and 2 to 4 per cent of all women may develop endometriosis of the rectosigmoid, rectovaginal septum or rectum.

The following are case reports of the four patients in this series in whom endometrioma of the bowel was present which was large enough to be confused with carcinoma.

CASE REPORTS

CASE 1. Mrs. H. L., a forty-seven year old white female, was admitted on August 9, 1954.

FIG. 1. Constricting defect without distortion of mucosal pattern.

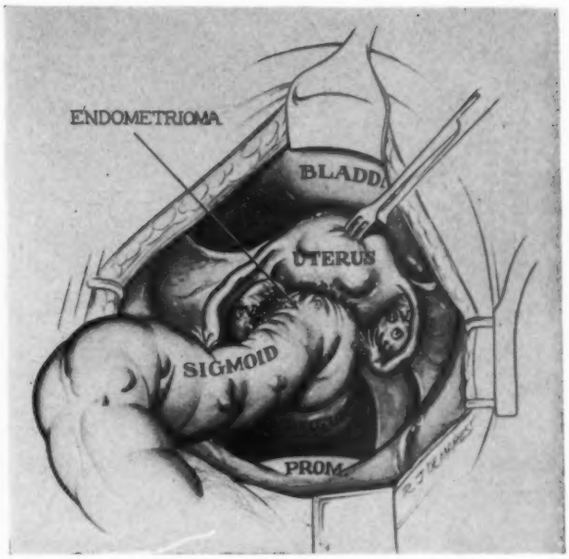


FIG. 2. Gross appearance at operation.

Her chief complaint was tenesmus of two weeks' duration associated with anorexia. One month prior to admission the patient had had a bloody stool following termination of her menstrual period. She also complained of abdominal pain which was worse with constipation. She had been taking prune juice in order to keep her bowel movements loose. Her menstrual history was normal. She had one child who was eighteen years old. Physical findings were normal except for pelvic examination which showed an enlarged uterus with the sigmoid colon apparently fixed to that organ. The laboratory work up was within normal limts. The barium enema demonstrated a constricting lesion of the sigmoid. (Fig. 1.) On sigmoidoscopy the instrument could not be passed beyond 10 cm. due to an abrupt turn in the rectosigmoid. Blood was not seen. A presumptive diagnosis of carcinoma with endometriosis as a possibility was made. Exploration on August 12, 1954, revealed a constricting lesion in the lower sigmoid which was attached to the lower posterior portion of the uterus and the left ovary. (Fig. 2.)

Gynecologic consultation was secured at the operating table and it was the opinion of the consultant that the lesion in the colon did not represent endometriosis. The lesion involved 3 inches of bowel and grossly appeared to be a carcinoma. Sigmoidectomy and total hysterectomy with bilateral salpingo-oophorectomy was performed. The patient's course was uneventful and she was discharged on the sixteenth postoperative day. Microscopically the specimen showed the typical appearance of endometriosis with endometrial glands in the uterine and bowel walls. (Fig. 3.) This patient has remained well.

CASE II. Mrs. G. R., a forty-one year old white female, was admitted on August, 1952, with the chief complaint of lower abdominal and back pain of many years' duration. These symptoms had become progressively more severe during the year prior to admission. There was also a history of nausea with occasional vomiting. Bowel habits had changed in that the stools were smaller and occurred more frequently. The patient had one child who was twelve years old. Her last pregnancy had terminated in a miscarriage. The menstrual history was negative except for some dysmenorrhea. Positive physical findings were confined to the abdomen which revealed tenderness in both lower quadrants. Laboratory examination proved non-contributory. Surgery on August 29, 1952, with the presumptive diagnosis of cystic ovaries, revealed a puckering lesion in the sigmoid which grossly resembled a carcinoma. The left ovary contained numerous chocolate cysts. The rectosigmoid was adherent to the posterior wall of the uterus. Sigmoidotomy revealed intact mucosa and it was evident that the lesion involved the seromuscular layer only. A diagnosis of endometriosis was made after biopsy of the bowel wall, and a left salpingo-oophorectomy only was performed. This patient continues to have symptoms.

CASE III. Mrs. E. R., a thirty-nine year

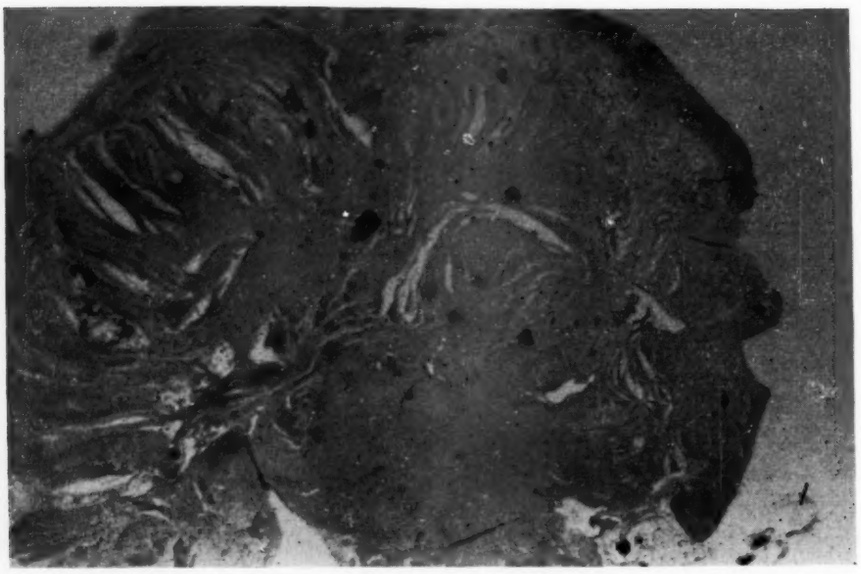


FIG. 3. Microscopic picture depicting typical endometrial glands in the colon.

old white female, was admitted on July 19, 1951. Her chief complaint was lower abdominal pain of long duration which had become progressively worse. The pain preceded her menstrual period by one week and persisted during the menstrual flow. There was no change in bowel habits. Physical examination was normal, except for the pelvic examination which demonstrated fixation of the cervix and induration of both adnexal areas. Laboratory work up was within normal limits. A preoperative diagnosis of endometriosis was made and exploration was performed on June 20, 1951. An endometrial growth 4 inches in diameter involving the rectosigmoid and the left ureter was found. Hydroureter on the left was noted. Total hysterectomy and bilateral salpingo-oophorectomy was performed. An intravenous pyelogram was obtained on the eighth postoperative day and showed hydronephrosis and hydroureter on the left side. The postoperative course was uneventful. The patient did not return for follow-up inasmuch as she indicated that she was feeling well.

CASE IV. Mrs. E. B., a forty-seven year old white female, was admitted on June 17, 1951, with the chief complaint of lower abdominal fullness of three years' duration. The patient also gave a history of a growth on the umbilicus which would become black and bleed during her menstrual period. She had one child eleven years old, delivered by cesarean section. There was no change in bowel habits. Positive findings were confined to the umbilical area, examination of which revealed a small papillomatous growth 3 mm. in diameter. Laboratory findings were normal. Laparotomy on June 18, 1951, showed sigmoid colon attached to the posterior wall of the uterus. The bowel was markedly infiltrated with endometrial implants and grossly resembled a malignancy although the

TABLE II
DIFFERENTIAL DIAGNOSIS

	Endometriosis	Carcinoma
Age	25–45 yr.	40–60 yr.
Sex	Female	65% male
Weight loss	None or moderate	Marked
Constipation	Intermittent and associated with menses	Progressive and of short duration
Blood in stool	Rare and if present, only with menses	Frequent
Fertility	Barren or one child	Children
Dysmenorrhea	Frequent and progressive	No relationship
Proctoscopy	Intact mucosa; no bleeding	Gross ulceration and bleeding
Barium enema	Long filling defect;[3] intact mucosa	Short filling defect; irregular mucosa

surgeon was certain it was endometriosis. Total hysterectomy and bilateral salpingo-oophorectomy was performed as well as excision of the umbilical lesion. The postoperative course was uneventful and the patient is presently enjoying good health.

COMMENT

The diagnosis of endometriosis of the large bowel is seldom made prior to surgery and even at the operating table it is difficult to distinguish this lesion from carcinoma. Cattell[1] cites one case in which an abdominoperineal resection was performed for a lesion which later proved to be endometriosis. Table II may serve to emphasize some of the problems in differential diagnosis.

TREATMENT

Conservative resection of the colon should be performed in those women of childbearing age who show signs of obstruction. In older women, surgical castration will result in resolution of the endometrioma.[10] Total hysterectomy and bilateral salpingo-oophorectomy was performed in three cases with complete relief of symptoms. In one case bilateral oophorectomy should have been performed as the patient is presently having difficulty. In another case sigmoidotomy with biopsy might have avoided resection and anastomosis of the involved segment of colon.

SUMMARY

1. Two hundred twenty-five cases of endometriosis were reviewed to determine the incidence of bowel involvement and the general problems involved.

2. In seventy-seven cases (34.22 per cent) the bowel was involved by endometriosis.

3. Four of these patients showed endometrioma of the sigmoid which grossly resembled a carcinoma.

4. Two patients showed signs of partial intestinal obstruction.

CONCLUSIONS

The average patient will show dramatic resolution of the lesion following surgical castration. However, in young patients demonstrating evidence of bowel obstruction, resection and anastomosis are indicated. In older patients with obstruction, temporary colostomy with castration may be indicated.

The series of cases of bowel obstruction is too small to establish dogmatic rules of treatment. Until more cases are studied and followed for a reasonable length of time, it is best to evaluate each case on its own peculiar manifestation.

REFERENCES

1. Cattell, R. B. Endometriosis of colon and rectum with intestinal obstruction. *New England J. Med.*, 217: 9–16, 1937.
2. Mayo, C. W. Endometriosis of sigmoid and rectum. *Surg., Gynec. & Obst.*, 70: 136–139, 1940.
3. Jenkinson, E. L. and Brown, W. H. Endometriosis. A study of 117 cases with special reference to constricting lesions of rectum and sigmoid colon. *J. A. M. A.*, 122: 349–354, 1943.
4. Thierstein, S. T. and Allen, E. A comparative analysis of the diagnosis and treatment of endometriosis, including a report of 53 cases of intestinal endometriosis. *Am. J. Obst. & Gynec.*, 51: 635–642, 1946.
5. McGuff, P., Dockerty, M. B., Waugh, J. M. and Randall, L. M. Endometriosis as a cause of intestinal obstruction. *Surg., Gynec. & Obst.*, 86: 273–288. 1948.
6. Berlin, P. F. and Finestine, E. L. Endometriosis of sigmoid. *New York State J. Med.*, 49, 2081–2082, 1949.
7. Steadman, H. E. Endometrioma, sigmoid, producing obstruction. *J. Internat. Coll. Surgeons*, 14: 317–324, 1950.
8. Bacon, H. E. Endometrioma, Anus, Rectum and Sigmoid Colon, vol. 2, 3rd ed., pp. 569–575. Philadelphia, 1949. J. B. Lippincott Company.
9. Grimes, A. E., Jr. Endometriosis with particular reference to involvement of the sigmoid. *Kentucky M. J.*, 48: 20–27, 1950.
10. Benz, E. J., Dockerty, M. B. and Dixon, C. F. Polypoid endometrioma of the colon. *Proc. Staff Meet., Mayo Clin.*, 27: 201–208, 1952.
11. Wachs, C. S., Weber, L. L. and Chodoff, R. J. Endometriosis of the bowel simulating carcinoma. *Am. J. Obst. & Gynec.*, 66: 1345–1347, 1953.
12. Urlson, H. and Tyson, W. T., Jr. Endometriosis of sigmoid colon. *Mississippi Doctor*, 9: 297, 1954.
13. Madding, F. F. and Spencer, F. M. Endometrioma of the sigmoid with vicarious menstruation and intermittent intestinal obstruction. *Am. J. Surg.*, 87: 133–136, 1954.
14. Governale, S. F. and Fioretti, C. A. Endometriosis of colon. *Rev. Gastroenterol.*, 20: 510–517, 1953.

Premalignant Lesions of the Colon

DAUGH W. SMITH, M.D., *Nashville, Tennessee*

From the Department of Surgery, Vanderbilt University, School of Medicine, Nashville, Tennessee.

THE colon and rectum are among the most common structures of the body to be involved with carcinoma. The National Cancer Institute has recently collected from ten large metropolitan areas 2,000 reports of patients with malignant tumors of the intestine. Of this number 57 per cent were found in the colon and 41 per cent in the rectum and rectosigmoid. If we apply these figures to incidence data from other sources, cancer of the rectum and colon is the most frequent carcinoma in men and the third most frequent in women. It is well established that the majority of cancers of the colon, if not all, arise from adenomatous polyps. With the new diagnostic aids it is possible to locate these polyps and eradicate them while many are still benign or non-invasive. Few other forms of carcinoma permit such prophylaxis. An appalling number of these lesions are allowed to become malignant because of the failure to search specifically for them. Therefore, a review of sixty-eight cases is presented in which operation for polyps of the colon was carried out, exclusive of rectal lesions.

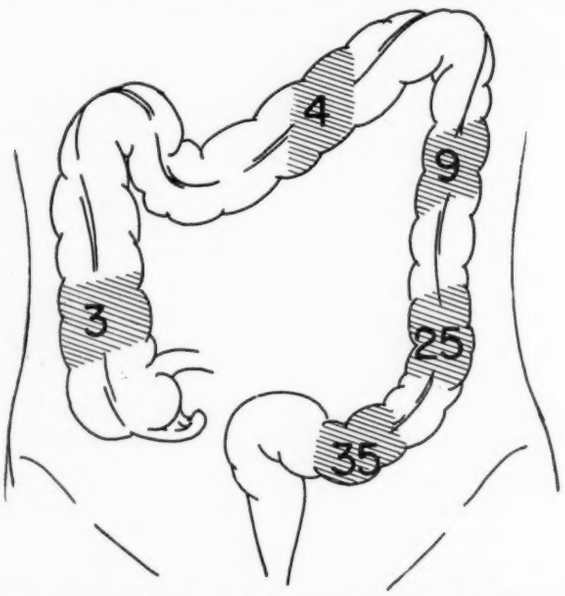


FIG. 1. Number of polyps removed from sixty-seven patients through transabdominal approach excluding the rectum.

INCIDENCE

In private practice, between 1944 and 1954, the author has operated on sixty-eight patients with adenomatous polyps of the colon. Of this group thirty-five, or 51.5 per cent, were men and thirty-three, or 48.5 per cent, were women. The youngest patient was three years of age and the oldest seventy-seven. The incidence in decades is given in Table 1. The greatest incidence was in the sixth decade and the next greatest in the first decade of life. There were twelve patients, or 17.6 per cent, with more than one polyp (this does not include cases of familial polyposis). One child of three years showed innumerable lesions with normal mucosa between the lesions. No family history of the disease was established. Colectomy and ileosigmoidostomy were performed. Figure 1 denotes the anatomic location of the lesions. It can be seen that the greatest incidence is in the distal colon. DeMuth and others[1] have reported that approximately two-thirds of the polyps and one-half of the carcinomas of the colon are within reach of the 25 cm. sigmoidoscope.

TABLE 1

NUMBER OF PATIENTS WITH POLYPS OF COLON

Decade of Life	No. of Cases
First	14 (20.6%)
Second	2 (2.9%)
Third	4 (5.9%)
Fourth	11 (16.2%)
Fifth	12 (17.6%)
Sixth	15 (22.1%)
Seventh	8 (11.8%)
Eighth	2 (2.9%)
Total	68 (100.0%)

DIAGNOSIS

In 80 per cent of the patients in this series the presenting symptom was bleeding. In four patients the chief complaint was hemorrhoids. In three children the mother had observed a protruding mass from the anus. Change in

bowel habits, abdominal pain, tenesmus, mucus discharge and abdominal fullness were less frequent complaints. Polyps were occasionally found during routine sigmoidoscopy for other anorectal lesions. The methods of diagnosis are generally three: the examining finger, the sigmoidoscope and the double contrast enema. In this series rectal polyps are not included *per se*, but several of these cases represent patients in whom sigmoidoscopy revealed a polyp and subsequent x-ray studies disclosed higher lesions. Because of the incidence of multiplicity of these lesions of 17.6 per cent, each patient found to have a polyp should have a complete colon study if there is no contraindicating obstruction. The 25 cm. sigmoidoscope, as previously stated, can demonstrate the majority of polyps of the colon. In this series of patients with polyps thirty-three, or 48.5 per cent, of the total number of polyps were visualized. Many polyps of the rectum and rectosigmoid can be biopsied and then destroyed with the monopolar current with practically no morbidity. In several instances in this group the polyps of the lower sigmoid that were too small to be demonstrated by roentgenograms were later seen by repeated x-ray studies. In nine, or 13.3 per cent, of the patients the lesion was demonstrated by both x-ray and sigmoidoscopic examination.

With the use of the barium enema and double contrast technic of examination, polyps of the colon above the reach of the sigmoidoscope can be readily diagnosed if they are searched for carefully. The roentgenologist diagnosed polyps in forty-four patients, or 64.7 per cent of this group. To visualize these lesions an adequate preparation of the bowel is required. First, the patient is instructed at the time of an appointment to cleanse the rectum with enemas preceding the office visit for sigmoidoscopy. If x-ray studies of the colon are indicated, the patient is then given written instructions for a liquid diet for twenty-four hours preceding the examination, 60 cc. of castor oil the night before and one enema on the morning of x-ray study. I have found this to be the responsibility of the proctologist. Double contrast air studies of the colon are mandatory when a polyp is visualized on sigmoidoscopy. If presenting symptoms are indicative of a polyp, repeated x-ray studies may be required to establish a diagnosis. Frequently polyps are found proximal to a malignant lesion; and if the proximal colon cannot be examined because of the obstructing tumor, then complete studies must be done after the tumor is resected.

Malignant changes were found in eighteen patients, or 26 per cent in this series. The only death from carcinomatosis was in a fifteen year old boy who presented himself with a six-week history of abdominal pain and rectal bleeding. X-ray examination showed a sessile sigmoid polyp. A radical anterior resection was performed. Many mesenteric lymph nodes showed metastatic carcinoma. The patient died of generalized carcinomatosis three years following surgery. It is of interest to note that after the age of thirty the incidence of malignancy was 37 per cent. The three patients over seventy years of age showed malignant lesions. Of this group there were seven women and eleven men with carcinoma of the colon.

TREATMENT

For seven days preceding surgery the patient is restricted to a low residue diet and for five days receives succinylsulfathiozole, 0.25 gm./kg. of body weight each twenty-four hours. Terramycin, 250 mg. every six hours, is begun forty-eight hours before operation. The patient is restricted to a liquid diet during this period of forty-eight hours. An enema* is given the evening before surgery.

At operation an effort is made to identify the base of the polyp, and the colon is opened longitudinally on the antimesenteric border. If the polyp is pedunculated, it is excised with the adjacent mucosa. The defect is then closed. The colotomy incision is closed transversely with two rows of interrupted sutures. This technic was used on forty-seven patients, or 70 per cent. The polyp from one patient removed in this manner was reported as benign on frozen section but later was found to be malignant on permanent section. Seventeen days after the first operation an anterior resection was performed. Four years later the patient had no clinical evidence of recurrence. Frozen sections of tissue are not dependable in making a diagnosis of malignancy in polyps. The surgeon must often rely on the gross pathologic condition at the time of surgery. The consistency and the appearance of the tumor and the presence of enlarged regional lymph nodes are helpful aids in differentiation. When

* Fleet's Phospho-soda.

the lesion was sessile or showed malignant degeneration in one area and was non-invasive, a limited wedge resection was done. This procedure was performed in six patients, or 9 per cent. When the lesion was microscopically malignant with local or with regional lymph node metastasis, a radical segmental resection was performed. This group included fourteen patients, or 21 per cent. The only major postoperative complication was an evisceration in a seventy-seven year old man following colotomy of the left colon for a malignant pedunculated polyp. Secondary closure was performed and the patient is now alive and asymptomatic seven years after surgery. There were no postoperative deaths. One fifteen year old male, as noted before, died three years postoperatively of carcinomatosis. He had positive lymph nodes at the time of surgery. All of the other patients are alive and well at present without clinical evidence of recurrence except for three who died from cerebrovascular accident.

COMMENTS

In those patients with polyps, bleeding was the predominant symptom which caused them to seek medical advice. It was noted in 80 per cent of the patients in this series. Other symptoms which may result from polyps of the colon are: feeling of incomplete evacuation, the urge to defecate, abdominal pain, obstipation, symptoms of obstruction and passage of clear fluid. The latter symptom is frequently the only symptom and is always associated with the villous type of lesion. This lesion is most commonly seen in the rectum but does occur in the colon. Therefore, evaluation of the entire colon must be made in those patients with this symptom.

In some patients with a history of bleeding from the rectum, the source of the bleeding cannot be visualized. These patients should have x-ray studies using the double contrast technic. If no lesion is demonstrated, re-examination should be done in one week. In a few patients in this series repeated examinations were necessary to demonstrate the polyp.

If polyps are allowed to remain long enough, they invariably develop malignant changes. In this series 26 per cent of the patients had malignant polyps. All polyps should be removed as a prophylactic measure against cancer of the colon. The prognosis for patients with polyps of the colon is excellent when these lesions are removed prior to malignant change and local invasion. Only one patient in this series died from metastases from carcinoma of a polyp.

SUMMARY

1. This report presents a study of sixty-eight patients with adenomatous polyps of the colon excluding those of the rectum.

2. The most frequent symptom, bleeding, was present in 80 per cent of the patients.

3. In this series 48.5 per cent were diagnosed by sigmoidoscopic examination. The author believes that sigmoidoscopy is one of the most important examinations in the diagnosis and prophylaxis of cancer.

4. Sigmoidoscopic and x-ray double contrast studies should be carried out in all patients in whom a polyp of the rectum or colon has been found. Multiple polyps were found in 17.6 per cent of the patients in this series.

5. Simple excision of a pedunculated polyp is adequate if the pedicle is removed with its base. Wedge resection is advised for benign sessile lesions. Radical resection must be carried out if there is local invasion or metastases to regional nodes.

6. The prognosis is excellent in those patients with benign polyps and in those in whom local non-invasive malignant change has taken place in the polyp.

7. In no other branch of surgery can cancer prophylaxis and treatment be so successfully carried out as in the excision of polyps of the colon.

REFERENCES

1. DeMuth, W. E., Jr. et al. Adenomatous polyps of colon and rectum. *Surg., Gynec. & Obst.*, 94: 195, 1952.
2. Page, R. C. Carcinoma and adenomata of the rectum. *New York State J. Med.*, 38: 1–4, 1938.
3. Phillips, R. B. Polyps of colon and rectum: general considerations and report of cases. *Proc. Staff Meet., Mayo Clin.*, 15: 1940.
4. Swinton, N. W. and Haug, A. D. Frequency of precancerous lesions in rectum and colon. *Labey Clin. Bull.*, 5: 84, 1947.

Villous Tumors of the Rectum

NORMAN L. FREUND, M.D., *Brooklyn, New York*

From the Division of Proctology, Department of Surgery, of the Jewish Hospital and Maimonides Hospital, Brooklyn, New York.

THE subject of villous tumors of the rectum has been occurring more frequently in the literature and most contributions stress the radical approach in its treatment. The two reasons for this attitude are that (1) villous tumors exhibit great tendency toward malignant degeneration,[6,8,11,14] varying from 20 to 45 per cent of cases; and (2) occasionally they recur, if locally removed, even after a lapse of many years.[21,22,34] Although it is not a very common tumor, most patients who were treated with local excision did very well. Therefore, at two institutions a review of villous tumors of the rectum was undertaken to ascertain what long term follow up would reveal.

A total of twenty cases* was culled from the records, excluding those classified as papillary adenocarcinoma. The paucity of material can be explained in part by the failure of pathologists in the past to differentiate by nomenclature the villous papilloma from the more commonly found adenoma. This widespread practice was not confined to our hospitals alone.[9] Very often there is an admixture of adenomatous and papillomatous neoplasia in the same tumor, and almost all of these were reported as adenomas. Some undoubtedly are primarily of the villous type[25] but to isolate all these cases would necessitate reviewing all the slides of rectal tumors in the pathology departments. Actually, papillomas are said to represent from 2 to 14 per cent of all rectal polyps.[13,21,22,34,35]

SIGNS AND SYMPTOMS

The villous tumor, or papilloma, is usually a rectal tumor, although it has occurred in other parts of the colon.[15] In this series, 70 per cent of the tumors were palpable; the other 30 per cent were found on sigmoidoscopy. The growth is usually single, soft, and velvety or mushy to the touch. The examining finger can penetrate into the mass. Any areas of induration that may be felt suggest the site of malignant change. Infection, however, can mimic this clinical sign.[7] Proctoscopy reveals a large bulky mass, most often sessile, freely mobile, lighter in color than the surrounding mucosa, and extremely friable to the point of finding "free biopsies" lying loose in the lumen of the bowel or instrument. Experience has taught us that these bits of tissue are usually benign. Biopsies, to be of value, must be taken from the growing edge and from the depths of the tumor. Many times, only after complete removal and examination of the "total biopsy,"[26] will a concealed malignancy become evident.

Symptoms include diarrhea, much of which is mucus, occasionally occurring as a clear liquid morning evacuation followed by a normal bowel movement;[30] bleeding with or between bowel movements; a sense of incomplete evacuation or frequent desire to defecate; tenesmus;[14] rarely a protrusion of the mass through the anus; and finally, possible signs of obstruction due to the size of the tumor. This last complication was not observed in our series.

Pathogenesis. Microscopic examination shows the fronds to be composed of the usual colonic epithelium of columnar cells interspersed with goblet cells, supported on a scanty connective tissue stalk with its fine vascular bundle. Frequently, in the deeper parts, acinar spaces are noted.[22] These are the "adenomatous" portions mentioned previously. A distinguishing feature is the pedicle. In the villous tumor, the stalk is wide and covered with tumor tissue[13] and gives the appearance of "trees in a forest."[25] Constant drag on the mucosa may cause a ribbon-like pedicle to develop. In contradistinction, the adenoma usually has a narrow pedicle of normal mucosa.

Breakdown of the basement membrane with invasion constitutes the only evidence that radical surgery is indicated. Alteration of

* These patients were treated by members of the staffs of each institution.

architecture by stratification and hyperchromatic staining in itself did not eventually predetermine widespread disease. In 86 per cent of patients with an intact basement membrane an apparent cure was obtained, while one of the only two patients with an "indistinct basement membrane in some areas" advanced to carcinoma.

Dukes[10] theorizes the papillary type of growth by multiplication of cells between the crypts of Lieberkühn. He also offers a plausible explanation of recurrences. The first change in the mucous membrane is that of diffuse hyperplasia, followed by neoplastic change in one area. Removal of this section alone may leave intact surrounding areas of hyperplasia which may be in the process of becoming neoplastic. Hence wide removal or destruction of mucosa is a *sine qua non* for successful therapy. As Binkley[32] stated, from above or below, "getting the whole tumor out" constitutes a cure. This excision must include adjacent mucosa. An interesting analogy to condylomata acuminata is drawn by Fansler,[19] who pictures the similarity in appearances and recurrences, and suggests a possible common factor.

Incidence. This series of cases differs from those reported heretofore and from the standard texts in that the incidence was greater in females and also occurred in a younger age group. "The old man of seventy" seems to hold true, but only in the male. Eleven of our twelve female patients ranged from forty-four to sixty-two years and averaged less than fifty-four. The average age for the entire group was just under fifty-eight years.

TREATMENT

The usual treatment advocated is of three types: (1) abdominoperineal resection, with or without preservation of sphincters;[11,14,17,21,28,35,36] (2) local surgical extirpation by delivery per anum, or by Bevan exposure;[1–4,11,14,16,26,28,35] and (3) local thermic methods mentioned by many authors only for condemnation, but the reverse opinion will be elaborated based upon our experience.[11,14,22,29,34]

Since the objective is to remove the whole tumor by any means, it was believed that the approach from below has its place in treatment.[12,32] Recurrence, when benign, is not to be feared,[13,20,34] for it does not in itself cause cancer, but usually results from adjacent hyperplastic mucous membrane or from incomplete removal.[27] Fulguration acquired a bad reputation because it frequently was not performed thoroughly. Thoroughness means destruction of surrounding mucosa as well as the tumor itself. This method is still widely used and acceptable.[5,7,15] The procedure and the necessary precautions have been adequately described by others.[23,24,33] The longest case on record is the twenty-one year follow up by Bowman,[31] who treated his own father. Sunderland and Binkley,[13] in a masterly treatise, report forty-eight cases, of which a group of ten were treated locally with excellent results after one to seven years' follow up. They state that "no tumor that showed a uniformly benign structure originally and in the early recurrences has developed infiltrating carcinoma to date."[13] I would change this from "no tumor" to "rarely," for our two failures were in this category.

ANALYSIS OF CASES

In these twenty cases, one tumor was annular, nine anterior, six lateral and four posterior. This anterolateral predilection in 75 per cent coincides with those of other authors.[35] The height of the lesion above the anorectal line varied from 3 to 16 cm., but seventy per cent were below the middle valve of Houston. Symptoms were present from one to thirty-six months, averaging nine and one-half months. In two patients the tumors were found on routine sigmoidoscopy.

Our treatment consisted of surgical excision in three cases by delivery through the anal orifice. All three patients had excellent results. Two are alive and well more than two years later, and the third patient died of heart failure at the age of eighty, free of the disease after one year. This method allows the excision of contiguous mucosa, the area of surrounding hyperplasia. Eleven patients were treated by desiccation alone (after snare removal), and three more had application of radon seeds in addition. Of the latter, two were palliative procedures only, for known carcinoma with metastases. In the twelve patients treated for cure, there was one recurrence of a benign nature on eleven different occasions over a seven-year period, the last three recurrences at another institution, from whose records we learned that a three-year follow-up is now negative. The two cases that progressed to malignant degeneration showed an indistinct basement membrane in one case and an intact membrane in the other. The former patient

had recurrence after three years. Desiccation was done after biopsy of "benign papilloma" and repeated six months later with the same report. Five years after the original treatment, a third recurrence showed adenocarcinoma. The latter patient also had recurrence on two occasions, after six and eight years, which also was reported as benign. Recent advice from a relative, however, proved that this patient died from malignant disease eleven years from the date of the original treatment.

Of the fifteen patients treated from below, with curative possibilities, all three of the surgical and ten of the twelve thermic procedures have yielded perfect results thus far. A cure rate of 83.3 per cent was achieved by desiccation alone, and 86.7 per cent when taken as a group.

One case at the 12 cm. level treated by colotomy, showed a benign structure on frozen section, and carcinoma *in situ* on paraffin section. No further surgery was deemed necessary after simple polypectomy, and the patient is asymptomatic after five years.

In two patients preliminary benign biopsies were not borne out after local removal, and both had abdominoperineal resections. One of these (E. Z.) refused hospitalization on three occasions, delaying operation for seven months. On biopsy the specimen proved to be colloid carcinoma, a common type of degeneration in villous tumors.[13]

CONCLUSIONS AND SUMMARY

Twenty patients with villous tumors were reviewed. Two of the tumors proved to be malignant and the patients treated by the Miles' procedure. In two other cases of malignancy with metastases, the patients were treated for palliation by desiccation and radiation. Of the sixteen remaining tumors, which were excised locally, two progressed to malignancy (12.5 per cent) and one recurred benignly on multiple occasions (6.25 per cent) but the patient was eventually freed of the disease. The remaining thirteen patients (81.25 per cent) are apparently "cured." Since we realize that repeated follow-up examinations[34] are as necessary as the original treatment, by adding the benign recurrence, we can vouchsafe good results in 87.5 per cent of cases. This compares with a series of twenty-eight patients treated by radical resection, yielding a 92.9 per cent survival rate.[35] Our series of cases is too small for great statistical value, but we have fourteen patients who are well, with their excretory apparatus intact, and only two failures, one of whom is still alive. Moreover, even a failure in treatment, if follow-up examinations are done routinely and often enough, can be recognized very soon after its appearance, and adequate resection then performed. It is realized, of course, that an added risk of dissemination must coincide with this waiting period, but many authors, numbering prom-

TABLE I

Case No. and Patient	Sex and Age	Site	Height (cm.)	Date of Operation	Operation*	Pathology	Years Followed	Result
1, P. K.	M, 76	Left anterior	15	7/24/36	D and R	Invasion	3	Palliation
2, M. D.	M, 49	Posterior	7	3/3/38	D	Intact	11	Recurred 9/44 and 9/46 as benign; died of cancer, 1949
3, G. M.	M, 62	Anterior	16	6/22/43	D and R	Intact	11	Alive and well
4, R. G.	F, 40	Right anterior	7	3/13/44	D	Intact	10¼	Recurred 11 times up until 8/51; none since
5, S. G.	M, 74	Anterior	15	10/11/46	D and R	Invasion	3	Palliation; died, 1949
6, I. H.	F, 52	Left anterior	10	3/24/47	D	Indistinct	7¼	Alive and well
7, D. C.	M, 37	Left lateral	10	6/13/47	D	Intact	7	Alive and well
8, S. Z.	F, 58	Annular	9	9/17/47	Biopsy	Invasion	1½	Miles' operation (9/25/47)
9, E. Z.	F, 47	Left lateral	8	11/15/47	Snared	Invasion	5½	Miles' operation (1/3/48)
10, S. A.	F, 51	Left lateral	13	10/12/48	D	Intact	5½	Alive and well
11, P. F.	F, 44	Left lateral	5	10/28/48	D	Indistinct	5	Recurred 11/51 and 6/52 as benign, and 11/53 as cancer
12, E. M.	F, 60	Anterior	12	4/16/49	Colotomy	Carcinoma *in situ*	5½	Alive and well
13, S. C.	F, 48	Posterior	16	8/23/50	D	Intact	4	Alive and well
14, M. N.	M, 67	Left lateral	4	10/3/50	D	Intact	4	Alive and well
15, L. R.	F, 62	Left lateral	6	1/2/51	D	Intact	3½	Alive and well
16, H. M.	M, 79	Left anterior	3	1/18/52	Surgical	Intact	1	Died of cardiac disorder; no disease
17, C. T.	F, 57	Posterior	7	3/14/52	Surgical	Intact	2¼	Alive and well
18, I. H.	M, 69	Anterior	6	4/14/52	Surgical	Intact	2¼	Alive and well
19, S. H.	F, 80	Right anterior	6	8/26/52	D	Intact	1½	Alive and well
20, E. C.	F, 47	Posterior	9	12/8/52	D	Intact	1½	Alive and well

* D, desiccated; R, radon seeds; surgical, by delivery per anum.

inent pathologists amongst them,[18] have repeatedly stated that the papilloma is very slow growing and very slow to become malignant. The total number of patients showing carcinoma was six, an incidence of 30 per cent, similar to other investigators.[6,11,35]

Our cases for the last four years showed uniformly good results, due partly to the adequate follow-up period, but possibly also to the increasing awareness of the individual surgeons of the necessity for thoroughness in treating not only the tumor, but also the adjacent mucous membrane.

The results obtained clearly indicate that removal from below, by thermal or surgical means, is an adequate method of treatment. We do not argue against more radical measures in which the tumor base is excessively wide, for then the end result would be a stricture; nor when the lesion is well above the peritoneal reflection, for thoroughness in this situation will endanger perforation. From our study, however, it would seem unnecessary to resect every rectum with a villous tumor.

REFERENCES

1. Mathews, J. M. A Treatise on Diseases of the Rectum, Anus and Sigmoid Flexure, pp. 514–517. New York, 1893. D. Appleton & Co.
2. Lockhart-Mummery, J. P. A case of successful removal of a large papilloma of the rectum. *Lancet*, 2: 888–889, 1905.
3. Hill, T. C. Villous tumors of the rectum. *Tr. Am. Proct. Soc.*, pp. 61–68, 1910.
4. Adams, H. B. A case of villous papilloma of the rectum. *Tr. Am. Proct. Soc.*, pp. 70–71, 1922.
5. Dunne, H. E. Rectal adenoma of unusual size. *Tr. Am. Proct. Soc.*, p. 109, 1924.
6. Rankin, F. W., Bargen, J. A. and Buie, L. A. The Colon, Rectum and Anus. p. 405. Philadelphia, 1932. W. B. Saunders Company.
7. Bowman, F. B. Villous papilloma of the rectum. *Canad. M. A. J.*, 31: 488–489, 1934.
8. Hayden, E. P. The Rectum and Colon, p. 309. Philadelphia, 1939. Lea & Febiger.
9. Bernhoft, W. H. Villous papilloma associated with multiple rectal adenomata without evidence of extension to colon. *Tr. Am. Proct. Soc.*, p. 589, 1946.
10. Dukes, C. E. An explanation of the difference between a papilloma and an adenoma of the rectum. *Proc. Roy. Soc. Med.*, 40: 829, 1947.
11. Gabriel, W. B. The Principles and Practice of Rectal Surgery, 4th ed. Springfield, Illinois, 1948. Charles C Thomas.
12. Binkley, G. E. and Sunderland, D. A. Diagnosis and treatment of papillary adenomas of the rectum. *Am. J. Surg.*, 75: 365–368, 1948.
13. Sunderland, D. A. and Binkley, G. E. Papillary adenomas of the large intestine. *Cancer*, 1: 184–207, 1948.
14. Bacon, H. E. Anus, Rectum, Sigmoid Colon, 3rd ed. pp. 546–659. Philadelphia, 1949. J. B. Lippincott Co.
15. Burns, F. J. Papillomas of the colon and rectum. *Am. J. Surg.*, 80: 97–101, 1950.
16. Best, R. R. Single and multiple polyps or adenomas of the colon and rectum—management. *Rev. Gastroenterol.*, 19: 57–66, 1952.
17. Lahey, F. H. and Swinton, N. W. Polyps of the colon and rectum as forerunners of cancer. *Lahey Clin. Bull.*, 7: 231, 1952.
18. Popper, H. New aspects of the pathology of the colon. *J. Internat. Coll. Surgeons*, 17: 286–296, 1952.
19. Fansler, W. A. Adenomas. *Mod. Med.*, 20: 83, 1952.
20. Gerendasy, J. Proctologic principles. *Rev. Gastroenterol.*, 19: 561–575, 1952.
21. Welch, C. E., McKittrick, J. B. and Behringer, G. Polyps of the rectum and colon and their relation to cancer. *New England J. Med.*, 247: 959, 1952.
22. Swinton, N. W. and Doane, W. A. Polyps of the colon and rectum. *S. Clin. North America*, 32: 923, 1952.
23. Haas, A. C. Electrodesiccation versus electrocoagulation: their application to adenomatous polyps of the terminal bowel. *Am. J. Surg.*, 84: 510, 1952.
24. Carter, H. G. Explosion in the colon during electrodesiccation of polyps. *Am. J. Surg.*, 84: 514, 1952.
25. Fisher, E. R. and Castro, A. F. Diffuse papillomatous polyps (villous tumors) of the colon and rectum. *Am. J. Surg.*, 85: 146, 1953.
26. Crowley, R. T. and Davis, D. A. A procedure for total biopsy of doubtful polypoid growths of the lowest large bowel segment. *Surg., Gynec. & Obst.*, 93: 23–26, 1951.
27. Castleman, B. Discussion of villous tumors of the rectum by J. E. Ryan.[29]
28. Blaisdell, P. C. Anal delivery of rectal tumors. *Surg., Gynec. & Obst.*, 97: 372, 1953.
29. Ryan, J. E. Villous tumors of the rectum below the peritoneal reflection. *Tr. Am. Proct. Soc.*, pp. 535–544, 1953.
30. Hayden, E. P. Discussion of villous tumors of the rectum by Ryan, J. E.[29]
31. Bowman, F. B. Discussion of villous tumors of the rectum by Ryan, J. E.[29]
32. Binkley, G. E. Discussion of villous tumors of the rectum by Ryan, J. E.[29]
33. Becker, G. L. The prevention of gas explosions in the large bowel during electrosurgery. *Surg., Gynec. & Obst.*, 97: 463–467, 1953.
34. Swinton, N. W. Polyps of rectum and colon. *J. A. M. A.*, 154: 658–662, 1954.
35. Bacon, H. E., Lowell, E. J., Jr. and Trimpi, H. D. Villous papillomas of the colon and rectum. *Surgery*, 35: 77–87, 1954.
36. Deddish, M. R. Panel discussion on diseases of colon and rectum, Section on Gastroenterology and Proctology, Meeting of the Medical Society, State of New York, May 14, 1954.

PANEL DISCUSSION

Residency Training in Proctology

DR. LOUIS E. MOON: Many questions have been asked in regard to board certification. Not only the applicants but also the Board have many questions and problems. As a result this panel was organized with the idea that we might be able to answer some of the questions or relate some of the residency problems which the Board and the applicants have. Needless to say, it is not a problem inherent to one group; each group has its own.

All of the boards in the surgical specialties were organized with one purpose, namely, to elevate the standards of that specialty. The functions of the boards are all about the same: first, to determine whether the applicants are eligible for certification, that is whether they have had the proper training to be certified; second, to test and evaluate the abilities of the applicants; and third, to issue certification to those who have complied with all the requirements.

In complying with these requirements we meet all the problems to be discussed herein, regarding available residencies and including comments on suitable training programs both in general surgery and in proctology.

We have asked three very competent men to participate in this panel. I am going to call first upon Dr. James McCormack, Associate Dean of Graduate Studies at Columbia University's College of Physicians and Surgeons. He will discuss some of the problems of the residency situation as they exist today.

DR. JAMES E. MCCORMACK: I have been asked to discuss a few general problems that affect all residencies and have chosen four circumstances, although they may not be considered problems, which I believe are of great importance. They will be discussed briefly under the topics of numbers, time, economics and quality.

We are all concerned with the problem of *numbers*, particularly those of us who have anything to do with planning an internship program, and more particularly if that responsibility happens to be in a hospital in a smaller community. Generally, most people know that there are approximately 6,000 graduates of American medical schools each year and about 11,000 approved internships. There is, therefore, the problem of balancing this equation.

I would like to amplify this a little and perhaps convince you that the internship is not the whole problem; the residency is a much greater one.

Medical graduates are increasing; there are well over 6,000 now. By 1960, if the figures of the Health Resources Advisory Committee are accepted, there will be 7,000 graduates; and if the figures of the Council on Medical Education and hospitals are used, there will be at least 7,300 medical graduates.

The number of internships has leveled off, around 11,000; but the number of residencies has climbed. There are almost 25,000 residencies approved today. If you add together the residencies, fellowships and internships, there are almost 36,000 house officerships to be filled.

It is evident, therefore, that the growth of the residency program is really the important point. There are many reasons for this growth. I think it is fair to say, however, that one of them is that certain hospitals, unable to attract interns, are convinced that the reason lies in the lack of opportunity to move on to a residency afterward. In some of these hospitals the available experience was further diluted by adding a residency structure on top of an internship. Of course, many other factors exist. This period of growth corresponds to the period when the specialty boards assumed dominance.

As far as proctology is concerned, as you know, the Board started in about 1949, right at the rapid growth phase in the residency curve. I do not think the Society can be blamed for this inordinate number of residencies because there are only about twenty-six ap-

proved residencies in proctology, one in 1,000 of the approved residencies.

Focus for a moment on the residencies—almost 25,000. In order to fill these openings with graduates from American medical schools every medical graduate would have to serve about four years of residency beyond his internship, provided that the residencies available balance with the particular desires of the candidates and the needs of the community for men trained in those particular specialties.

Obviously, the topic being discussed is residencies as preparation for certification. This does not reflect precisely the history of specialization. Witness the fact that the American Proctologic Society goes back fifty-four years, and we can go further back than that, as a matter of fact 4,500 years.

Medical historians tell us that in 2500 B.C., at the Egyptian court, there were a large number of court physicians, all of whom were specialists in some particular area of the body. You will be interested to know that the kingpin of that group at that time, the chief court physician, had two specialty titles which were Palace Physician of the Belly and Guardian of the Anus.

The next circumstance I would like to discuss briefly is *time*, as related to the individual. For instance, are we requiring too much time in residency training?

A young man who aspires to join the group of certified specialists has to go through, after twelve years of primary and secondary school, four years of college, four years of medical school, and if he is a good student it is likely that some professor will try to persuade him to take a year out for research, and one year of internship; somewhere along the line he spends two years in military service, and then from three to six years of residency (usually four to five)—and that is a long time. We begin to hear occasional stories like the one about a surgical resident a year or two ago who had a coronary; he was nearly forty years old.

The third point I would like to raise briefly is the matter of *economics*. We are not talking about the fact that a resident has to deprive himself for a long time of the standard of living that he is entitled to, but rather the great importance of health insurance programs. We all know of the growth of health insurance programs, but I think it is good to be reminded of the over-all picture.

The Health Insurance Council analyzes the data each year on the number of people in this country covered by hospital insurance, surgical insurance and medical care.

They are usually six or eight months behind, and these figures are as of December 31, 1953. Approximately ninety-eight million have hospital insurance and about eighty-two million have surgical insurance. The figures for December 31, 1954, will be coming out soon and about 102 million people will have hospital insurance and about eighty-six million surgical insurance.

The curves are continuing upward, so you can safely assume that there are now about 105 million people with hospital insurance and about ninety million with surgical insurance.

Recently we passed the 165 million mark in our national census, so it can be quickly calculated that two-thirds of the people have hospital insurance, and about 55 per cent have surgical insurance.

The rate of growth was greatest in 1953. There was an 8 per cent increase in those covered by hospital insurance, a 13 per cent increase in those covered by surgical insurance, and a 20 per cent increase in those covered by medical insurance. For 1954 the figures will show the same relative rate of increase, that is, the percentage increase is greater for medical care than for surgical care or for hospitalization insurance.

Some people think these curves will level off at about 85 per cent. I am not sure they will. As a matter of fact, the Administration has two bills under consideration at the present time: one to supply health insurance for the military, particularly to cover their dependents, and another to cover the civilian employees of the government. Immediately this brings in several million more people. Incidentally, the hope is that when people leave the military, or leave government employ, they will continue this insurance.

Everyone knows of the influence of labor unions in increasing insurance, and indeed from time to time the possibility of insuring the indigent has been considered. As a matter of fact, the late Mayor LaGuardia thought of that years ago in New York, and anyone from the State of Washington will, I think, confirm the fact that an indigent patient there can select a physician or go to a hospital and the State will pay for it.

Therefore, we have to consider the prospect that eventually all or most of the people in this country will be covered by insurance and we will all see the rapid diminution of ward patients.

This will have a great effect on our residency system. It is all right for an internist to state that he can demonstrate a heart murmur and let a lot of residents listen to it, and many can study a chart that shows the dramatic recovery from diabetic coma. However, these arguments do not apply as convincingly in a surgical specialty.

Doctors in university centers point out that their private and semi-private patients do not object to being used for teaching; these patients came to a university center with the understanding that it was a teaching center. In many places the lack of ward patients is a serious handicap in training residents in surgical fields. Certainly the Society of University Surgeons is very much concerned with this, and I think everyone should give it some thought.

In a discussion of this sort, it will be said that there are ethical problems involved, but I think these are really not so much matters to be interpreted in the code of ethics. We must set down a code of economics, and we must do it soon.

The fourth circumstance I mentioned is *quality*. Obviously, quality would be the first thing to think about, or discuss, in any such panel. However, I am going to discuss the obverse side of this coin, although it should be said at least once that the most important element in any residency program is that the attending staff must be of the highest caliber and integrity. They must be possessed of a real desire to teach and also an ability to teach. Some people have the desire and not the ability, and in others just the reverse is true. Indeed, one can go so far as to say one must have a love of teaching. However, you cannot think of a teacher except in relation to a student, or a preceptor except in relation to a preceptee.

Most of us, at least until the last few years, have been in contact principally with trainees who were graduates of American or Canadian schools. None of us pretends that all trainees are alike, but actually when you are dealing with graduates of American and Canadian schools, the difference between the graduates of the best known schools and the least well known schools is really very little, certainly no more, in my opinion, than the difference in any single school between a graduate in the first third of the class, and one in the last third of the class, and that is not as great a difference as you may think.

However, within the last few years, since the war, as you all know, there has been a considerable number of physicians trained abroad who have come here, either as immigrants to further their training and then establish a practice, or for a period of training, intending to return home.

The standards of pre-medical and medical education in other parts of the world are not as carefully controlled as they are in this country, and I am sure most of you from firsthand experience can verify that it makes a big difference. We have learned what the Navy learned long since, that in a convoy, the speed of the convoy is conditioned by the speed of the slowest ship. This is not a criticism of any individuals, or any particular schools; but it cannot be denied that many residency programs have been slowed down by the presence of poorly selected graduates of foreign medical schools. Indeed one well known Midwestern university for a number of years took certain of these foreign medical graduates into the undergraduate medical school for a year and then awarded them medical degrees, because that particular State required an American degree for licentiate. Finally the faculty had to abandon the plan because it slowed down the program for their American undergraduates. We must all be aware of this.

In the last two years (1953 and 1954) 8,000 or more house officerships and 5,000 or more residencies were unfilled. If those positions which are filled by foreign physicians were eliminated and were to remain unfilled, and if we relied upon graduates of American schools only, there would be a total deficit of 14,000 house officerships, or 8,000 residencies.

Into this vacuum, obviously, many physicians would be attracted from abroad. It has been estimated that there are 6,000 such people. One difficulty is that heretofore it has been impossible to separate the graduates of foreign medical schools who were here as immigrants and those here for training only. The evidence would indicate that the D.P. phase has passed its peak. For the current year the Institute of International Education

made a survey which showed that there are over 5,000 non-immigrant foreign physicians serving as interns or residents in hospitals approved for internship or residency. Incidentally, the State Department confirms that a small but significant number of physicians from abroad are in unapproved hospitals, which certainly is some form of exploitation.

CHAIRMAN MOON: I think Dr. McCormack's comments give some conception of various phases of the problem facing the specialty boards and groups in the placing of men.

We all realize that to do special work, to be a surgical specialist, you must be a surgeon first. I do not believe that anyone is entitled to perform surgery of the abdomen or colon unless he is competent to meet all the situations that might arise in doing this type of surgery. He has to perform pelvic or urologic surgery. He may have to repair or transplant a ureter. He may have to perform some gastric surgery because he will find lesions that involve the upper abdomen.

Therefore, the requirements of the man applying for certification in proctology should include that of a good general surgeon first; this seems to be one of the stumbling blocks. We have come upon men who believe themselves eligible for certification, who have had very little surgical training.

I think the trend in all of the surgical specialties is toward more surgical training. Of course this involves one of the problems mentioned by Dr. McCormack—time element. If we increase the time element in surgical training, it may detract some from the specialty, because a man who has had three or four years of general surgical training generally comes out fairly competent to do most anything, and sometimes he does not choose to limit himself to one type of work.

We have asked Dr. Mulholland to describe what he thinks is adequate surgical training not only for proctology but also for other surgical specialties. I think perhaps he might have the same idea that it should be standardized for all specialties; that to be a surgical specialist, the surgical training primarily should be about the same.

I take this opportunity of presenting Dr. John H. Mulholland, Professor of Surgery, New York University, Director of Surgery of the Third Division of Bellevue Hospital, New York City.

DR. JOHN H. MULHOLLAND: I was thinking, as Dr. Moon was about to introduce me, that he has said pretty much what I would believe, and what I would judge to be the proper attitude about general surgical training with regard to a specialty. I wish I could answer his question about the adequacy of general surgical training with respect to all specialties, or any one specialty. I am sure I cannot answer it, except to say that I believe a surgical specialist should be, as he said, a surgeon beforehand.

I have some notes on remarks to make concerning this subject which have to do with the third element of a residency that Dr. McCormack referred to, the quality of a residency. I think it might be well to go back to where the whole concept of residency training in surgery began—with Halstead at Hopkins.

Dr. Halstead was imitating the German system of a long process of intimate contact with surgical patients. He recognized the need for this long period and coined the term residency to describe this experience. A certain ideal program was set up from which there were outstanding products recognized throughout the world as having gained a tremendous advantage in their personal equipment, so that an attempt was made to duplicate this type of training throughout the world.

You will recall that Halstead trained surgeons over an indefinite period of time; sometimes five years, sometimes six, sometimes eight, depending upon the individual. He would keep the man for as long as he thought it was necessary for that individual to have achieved skill, a sense of responsibility and a complete competence not only in what we now call general surgery but also in all of the specialties. The man was a neurosurgeon, urologist, plastic surgeon; he was trained in all the so-called specialty aspects of surgery. What he did when he finished that residency was his own affair. He might concentrate in one area, but his training was in all areas of surgery.

It shortly became obvious that this type of training with the creation of specialty boards, categories of practice and so forth, was not practical. It is well to recall, too, that Halstead's students were highly selected persons, probably the best of the crop of medical students, of people who were aspiring to be leaders in the surgical profession, to be professors; a very important part of the residency which Halstead established went beyond the

contact with patients and clinical material, and the responsibilities for administering the house staff, and for teaching; there was a long period of intimate contact with the professor himself.

Halstead was notoriously a far-away person to almost everyone except the resident who would spend long evenings with him and eat with him; they came to know each other very well. It is a shining example of the value of the master-pupil relationship in any type of training, particularly the type of training which is the subject of this discussion.

In preparing for this panel I checked the requirements of the American Board of Proctology, and I was happy to see that emphasis is placed on what is called preceptor training, because the highest type of graduate education in the Halstead residency, the very summit of graduate experience, was this close contact between the pupil and the master, and nothing can substitute for it.

In establishing residencies, as they exist today, I am fearful that instead of the substance of the Halstead residency, we duplicated the form. We established the system and let slip the primary and basic objectives which Halstead sought. As a result we now find ourselves with systems of residencies, prescribed time and certifying boards—we have as their authority to conduct or to direct training programs the certificate which they hold out for the end of the period.

Boards are created in finer and finer subdivisions of the specialties, particularly surgical specialties, each one with its own rules. If the rules are examined carefully, some most ridiculous provisions will be found.

Some boards have rules regarding conduct of practice throughout the specialist's lifetime; rules about how he will be paid for what he does and provisions that if he is paid in other than the way the board prescribes his certificate will be revoked; rules about belonging to societies and so on. For instance, it is a rule of a certain board that a surgeon they have certified can hold a certificate if he operates. If he were to take a gallbladder out, it can only be in a female patient; if he were to remove the gallbladder from a male patient, his certificate would be revoked. This presumably is a certificate of competence. It is a certificate saying you are qualified; you have had experience; you have had training, and you have passed an examination.

I will admit that it is unfair to focus on the ridiculous autocratic, bureaucratic rules which some boards have set up, because I firmly believe that the net result of board certification has been a tremendous uplift in the standards of medical care. These rules are merely an example of how objectives have been lost, and I would like to recall how we might restore some of these objectives in training programs.

Examine the program as it exists, and then look at the program as the boards have designated they should be.

I can very well sympathize with Dr. Moon in his job as Chairman of the American Board of Proctology. I am just finishing six years on the American Board of Surgery; and when I get off that Board, it is going to be like taking off a pair of tight shoes. The problems have been so difficult to decide upon, to arbitrate about, because the primary objectives of the person seeking training and education have been lost. He is spending time—getting a year of credit here and there which he adds up and says, "This is experience. I am a surgeon, because I have done this so many times, and I have taken so many hours of this and that." This is, of course, a complete loss of the objective of a surgical residency.

To assume, for instance, that of a four-year residency, the first two years are half the residency is silly. To assume that three years of a surgical residency is two-thirds is worse than silly, because the first three years are a preparation for the year of final responsibility, of final sense of direction, the administration, the control of a large group of patients from whom experience can be gained; the final year of contact with the chief, or with somebody on the staff who has a deep sense of obligation of a master with respect to a pupil. Likewise, three years of a four-year residency is not three-quarters; it is not even one-half. If I were to put a figure on it, I would say it is about one-third of the total residency, and that two-thirds of the total residency are in the year in which that man really rises to the job for which he has been preparing.

If we look upon it that way, we can see that what we gain by arbitrarily saying each applicant will have two years of general surgical training—or one year or three years—it is not as one would be led to expect that he has put

in half the time and, therefore, is half trained. He is not. He is one-fifth trained, possibly.

The next point I have to make is with respect to the board prescribing that the resident's experience shall include various aspects, with an attempt to cover the field and to have a resident acquire experience through the performance of a certain number of gastrectomies, thyroid operations, etc., assuming that at the completion of these he has covered the field and is broadly trained. I believe that is a fallacy.

I do not believe that any surgical service I have seen—and I have seen a great many during trips that I have taken with the American Board of Surgery—could possibly cover the field of surgical experience. We have to abandon any idea of such a thing. On our service, we have certain unique opportunities. We have an emergency ambulance service. A great many of the patients who are brought in have largely been uncared for prior to admission. They are poor. There is also a trauma service through which a large number of people are brought in as the result of accidents.

I do not believe that hospitals such as the Mayo Clinic could possibly duplicate the experience which we have.

In some of the other large university hospitals, the patients are considered as a whole. The diagnoses and decisions about therapy have been carried on before the patient even gets to the hospital. The program is all outlined and the resident does not get the experience that he would in Bellevue of a patient coming in absolutely cold with a ruptured intestine.

We do not intend to duplicate, in our clinic, the vast number of duodenal ulcers that will come into Presbyterian Hospital; at Bellevue we do not see the chronic type case. It is a disease of a different economic level. By the same token I do not believe what we see at Bellevue can be duplicated, such as patients admitted in diabetic coma or with gas gangrene of the leg, or something like that.

The important thing is for the basic surgical principles to be carried out in every case; these principles are easily transferable from one category to another. It does not make much difference whether it is the left gastric or the inferior mesenteric artery that is being tied; the technic of tying arteries is the same in both situations. Likewise, it does not make much difference whether it is the saphenous vein or the pulmonary vein, the technic of tying being the same in both instances. The principles of tying a blood vessel, of isolating it, of stopping the bleeding, will apply to all operations. Of course, the principles of careful dissection and of a knowledge of the circulation is important.

I would say, further, that as a result of boards, prescriptions, programs and so forth, we have now reached a point where we are judging the qualifications of a man by the length of time he studies. Frequently it is inadequate time, with the man moving from place to place without the final year of responsibility. The board gives him an examination; an examination which all educators admit is imperfect.

We assume, for instance, that when a candidate writes down the correct answer to a question he has learned what he writes. We assume also that if we tell him something, and he is able to repeat it to us, he has learned it. We are testing therefore the ability of the applicant to hear something, to read it, to repeat it or to write it. This is the type of ability tested in an examination.

I do not believe this achievement has much to do with the ability or training of a surgeon. The frame of reference from which a well trained surgeon works can come through no shortcuts, no visual aids, no compendiums carefully written, no textbooks. It must come from experience with patients. He must go through many, many periods of frustration with the lack of knowledge and with the desolate, alone feeling that every doctor experiences in the presence of a patient, and the conviction that you cannot find the answer to this problem in a book. That type of frustration, the floundering for the answer and the thought and pain involved as well as the sweating out in meeting those problems is what creates and provides the experience that makes a surgeon.

Our examinations do not test this quality, although I am sure Dr. Moon will agree that the person who has it and comes up for oral examination is recognized almost instantly. If you ask a man a question and he says, "Well, I treated a patient in such a way and this happened, and I thought this or that," you cannot say that no matter what is in the textbooks he did not see it or it did not happen. That is his knowledge alone. This is the kind of knowledge that a surgeon must acquire.

Apropos is the analogy between reading books about swimming and swimming. A man can read an encyclopedia on swimming, know all the facts about buoyancy, muscle action, kicking and so forth. One would say he is a very learned person about swimming—*but if he has not been in the water, he does not know how to swim!* What he knows is not swimming, but about swimming. Our examinations now, I am afraid, are testing knowledge about surgery and not surgical ability. I may be wrong about that.

CHAIRMAN MOON: How are we going to find out about the other?

DR. MULHOLLAND: I am sure the way to find out about it, and the way to establish it, is not to have 25,000 residencies. There could not be that many.

I certainly am not for the establishment of more rules and regulations, or more categorical statements by boards or societies about what a man should do or should experience. It is a personal thing.

I repeat that I believe in a master-pupil relationship: a sound master who says to the board, and they know he is trustworthy, "This man is well trained." This is the best information to be had about any candidate.

I need not say to this Society, with respect to surgical specialties and your own surgical Society, that it is impossible in your thinking with respect to patients or patients' problems to separate the colon, rectum and anus from the rest of the patient. Your Society which started the proctology board has elevated the standards of surgical care in one respect, at least, in that you have prevented strictures of the rectum which follow operations around the anus, and incontinence which will result from improper surgery of the sphincter.

The problem in a patient who is incontinent is certainly a local one. It has to do with that sphincter, and what can be done about it. The Society has succeeded, I am sure, in preventing the problem a good deal by raising the standards of care, and by recognizing basic principles which deal with gentle handling of tissue and exposure of parts that are important and delicate.

You have demonstrated that these things can be done without incidence or catastrophe. In the presence of a catastrophe, as I said, the problem is local. It has to do with the anal sphincter. The man who assays to fix it must be thinking. While he is planning to repair this cut sphincter, he must be thinking ahead in terms of as far reaching a subject as psychiatry. He must be using psychiatric technics, subconsciously perhaps, because of his patient's distress. He must be thinking in neurologic terms, in neuromuscular mechanism terms, in terms of wound healing, of function of the gastrointestinal tract in general, of the principles of drainage and of all those things which are general surgery. Without a background of thought, of automatic thinking which provides those things to him, he cannot do it well. He cannot do it according to the standards which are established today.

The American Board of Proctology requires two years of general surgical training. As I said before two years is not half of the general surgical residency—it is very much shorter. What the trainee in general surgery will gain from those two years will not be through operative experience or the frustrations and floundering I mentioned. It will be through contact with people who are experiencing those things or through contact with doctors who have reached the final stage of their residency. They are, therefore, selected individuals with certain qualities—the prime one being a deep sense of satisfaction and fun in doing something well, personal satisfaction, not because the chief is going to see it or because it is going to be in the record but because the individual himself would be dissatisfied with anything short of the best.

In the training of a surgeon exposure to that type of individual is more important than performing ten gastrectomies. In this respect I would like to point out how we operate at our service. In Bellevue Hospital it is a general surgical service. There is no surgery of the colon, the rectum and anus, no proctology service. We are very fortunate to have on our staff one of your members, Dr. Cowett, who is interested in this field. He participates in the thinking and conferences in general surgery, and so forth. He is responsible for teaching undergraduate medical students methods of examination of the human patient. He runs a clinic called a Rectal Clinic, and he guides general surgical residents, assistant residents and interns through their experiences with this type of surgery.

I have a comment which I questioned whether to utter. I think now I shall, since

Dr. Moon made those eloquent remarks. It is a great source of personal regret to me that the American Board of Surgery did not maintain its original concept that applicants for certification to the American Board of Proctology should first have a certificate of the American Board of Surgery. I think that would be the ideal. I think it is the trend in new boards. The American Board of Thoracic Surgery has done this and now a new board in trauma is proposed which will require for admission to their examination certification by the American Board of Surgery.

CHAIRMAN MOON: I am very pleased that Dr. Mulholland has emphasized the problem of having the right type of supervision in any teaching program and that you must have the right type of person heading a program of this type. As he says, it is the quality and not the quantity in the training that tells. The man who is competent is not the man who has seen the largest number of cases, but the one who understands the work he does best.

I think we as a board have the same frustration as the men who are being examined. We believe, as Dr. Mulholland has said, that all our examinations are not adequate—none of the boards are satisfied with their methods of examination. We do not have the means of evaluating men. We have men come in who are competent, but who have stage fright, and you do not determine the competency in their examination.

So the Board is just as much frustrated as the men taking the examinations. Maybe we feel as badly about it sometimes as you do when there are failures and you yourselves are competent. So we have troubles, too.

Our next speaker is one of the members of our Board who has had some experience in serving as a preceptor, and I might liken him to the man who understands what Dr. Mulholland has been talking about. I am going to ask Dr. Robert Scarborough to talk about some of the problems of conducting residencies and preceptorships.

DR. ROBERT SCARBOROUGH: I agree with Dr. Mulholland that basic training in general surgery is a requirement in any surgical specialty. However, I definitely disagree with him that proctology as a surgical specialty, and the American Proctologic Society as a society, and the American Board of Proctology have elevated the practice in this specialty only in the treatment of anal stricture, and incontinence of the anus. Proctologists have made and continue to make important contributions to the advancement of surgical treatment in the entire field of colonic and rectal disease.

I think we all agree that training in any field of medicine is a perpetual process which must go on indefinitely, if we are going to continue to be good doctors and improve our ability to care for patients. These and other scientific meetings are part of our continued training. I do agree with Dr. Mulholland that we should not confine our postgraduate and post-postgraduate training to the limited field of our own surgical specialty.

Frankly, I think I get more out of attendance at general surgical society meetings in the way of pleasure than I do at meetings in proctology. At the latter I learn a lot about my specialty, but it is stimulating and important to all of us to keep up with the advances in all fields of medicine.

Knowing that training is a perpetual process, we must, nevertheless, decide how much of that period of training shall be in approved residencies, or in approved preceptorships in order to qualify for board certification. All boards are powerless to see to it that diplomates continue their education.

I agree that rules are bad. On the other hand, you must have certain basic general qualifications upon which you can give approved certification.

The American Board of Proctology, in active function, is still a young board, having been approved now for five years.

It has been surprising in this period of five years the number of changes of concept that we of the Board have had about rules and regulations which were made tentatively, and rescinded when we realized that they were not the proper rules. The Board has attempted to minimize rules. In fact we have what we call working rules which are not incorporated in any constitution or by-laws, and which can be reconsidered, revoked or changed in order to reach, if we can, the proper balance of decision in regard to the authority, as well as the responsibility of the Board in approving certification.

I am sure that there are going to continue to be changes in such rules, and I think one of the worst things that can happen to a board is to get itself in a rut and establish rules and regulations which remain dogma year after year without change.

With 25,000 approved residencies in the country, and only 7,000 or fewer graduates in medicine each year, a real problem exists. This is really not the responsibility of proctology, as Dr. McCormack has stated, since we have only twenty-six approved residencies in proctology. It is a more general problem in all surgical specialties, as well as the general fields of medicine and surgery. Dr. McCormack is one of the men of this country who is trying to find a solution to that problem, and I certainly hope he will find it.

In our particular field, however, with its limited number of residencies, I am sure we all know that our responsibility is to elevate the quality of our training program in this specialty. We must continue to work together to see that we keep up the quality of training in proctology, whether or not it is as a residency program of training, or possibly under some circumstances as a preceptorship period of training.

I believe that the principle of preceptorship, which is that of a close, personal, continual relationship between the teacher and the student, is one that is of great importance in the training of doctors today. Too may times in large public service hospitals, the individual patient and his relatives are forgotten as individuals. The men who get their training in this type of approved residency program are missing some of the important educational features of contact with private patients and their relatives, which can be supplied in preceptorship training, and which is of great value in educating our doctors for the care of the private patient.

If we are going to have socialized medicine, and all the practice of medicine will be on a socialistic system, such training will not be of value. However, if we are going to continue to preserve the private practice of medicine, I think that such training is of the greatest value.

The American Board of Proctology has recognized that there is a value to preceptorship training. We also recognize that its value is only as great as the preceptor. In evaluating preceptors, we have the same difficulty that all boards have in the evaluation of candidates for certification, and in the examination of candidates in general. I think that perhaps some of you may have resented the inquiries and the questionnaires that the Board has sent to members of this society who have served in the past and we hope in the future will continue to serve as preceptors.

Those have not been sent in any spirit of criticism or personal inquiry as to the individual preceptor. They are sent because the Board is trying to set standards of training by preceptorship which will be adequate to fulful the quality of training that all men must have, we believe, who are to be certified.

I sometimes wonder just what is being accomplished by certifying boards in general, whether they are for sub-specialties or general specialties. In many parts of the country today the appointment of staff members to hospitals depends entirely on certification in a particular field in which they work. Personally, I think this is a great mistake. I think that the staff members of a hospital group in a particular locality can evaluate the quality of work of an individual, his moral integrity, his ability to care for patients on a personal basis, far better than a central board which can merely certify that an individual has been exposed to a certain amount of training and has passed an examination based on that training.

I am not sure where this is leading, but I think that we must be careful that boards do not become too powerful, do not become too autocratic. They should serve the medical profession for elevation of the standards of medical practice. They should have the responsibility of certifying that individuals have received their basic qualifying standing. But beyond that, personally, I think they should have no authority and no responsibility.

CHAIRMAN MOON: Dr. McCormack, do you have anything to add?

DR. MCCORMACK: Just to amplify one of the points Dr. Scarborough made about the boards, namely the many things that are contributing to perhaps an undue importance of the boards—I should put my arms up because these are all board members here, and I am not.

Some people have a tendency toward aiming at that hurdle, and when they go over it, they are finished. They may be certified in 1945 or whatever year it is and after that they are not interested in keeping up. Obviously they are the wrong kind of people to be specialists. The suggestion has been made by some doctors in internal medicine that board examinations be taken every five years, merely to see that the specialist keeps up with the advances in his field. The American Proctologic Society should be congratulated on the type of program they have at their annual meeting, with one full day devoted to the basic sciences. I think

more specialty groups ought to adopt this system.

CHAIRMAN MOON: I think the doctor realizes the functions of the board do not involve any police action. Of course, if the man does not continue his studies afterward, I do not know what a board can do about it. I think there have been some changes in the thinking with regard to that which has been brought about by the Advisory Board of Medical Specialties in advising that they should not limit their board by saying that if a doctor belongs to one board he cannot belong to another. They have changed that conception a good deal within the last year or two.

I would like to know if Dr. Mulholland has any rebuttal of some of the remarks that were made.

DR. MULHOLLAND: Regarding the suggestion that persons certified by the board take examinations every five years, I am heartily in favor of it, except that I give them not take them. Of course, Dr. Scarborough referred to my example of what the American Proctologic Society and the American Board of Proctology have done to elevate the standards of care. I whispered to him that that is only an example. Since then I have been trying to think of other ways they have done it.

With reference to Dr. McCormack's presentation I would like to ask him about these 25,000 residencies. It is not possible that there are 25,000 hospitals approved for residency in this country who have as their prime interest the training of doctors or specialists. I do not believe this is possible. There must be some other motive for the establishment of those residencies. I would like to ask him how much a part of those motives is the exploitation of a resident in the care of private patients, and whether the solution should be that when a resident renders service to a private patient or to a patient of a staff member, he be paid appropriately for that service rather than the sparse wages of a resident.

DR. MCCORMACK: Of course, it is difficult to estimate how many of these 25,000 appointments, and there are a little over 1,000 hospitals that are approved, represent exploitation. I certainly would not want to be the one to point the finger, and yet there is no question that there is a fair amount of exploitation.

This is one of the things that I had in mind when I said that an economic problem is coming up which concerns us all. Although I was one of those brought up on nothing, or next to nothing (I trained with Dr. Mulholland and Dr. Cowett at Bellevue and we received seven dollars and fifty cents every two weeks), we cannot say, "Well, we went through that so why should not the rest of them?" Times have changed and the fact is that residents are treating more and more private patients and it is, therefore, appropriate that particularly top residents who have had a good deal of training be better paid.

We have all heard much about actions of certain segments of organized medicine with respect to who shall receive the fee when a ward patient is covered by insurance, perhaps through a union, and there have even been threats of law suits against hospitals in which a resident has his name put on a bill. This is what I meant when I said that we tend to think of this in terms of a problem of medical ethics. It is not. It is a matter of economics and we are going to have to give it some more hard thought.

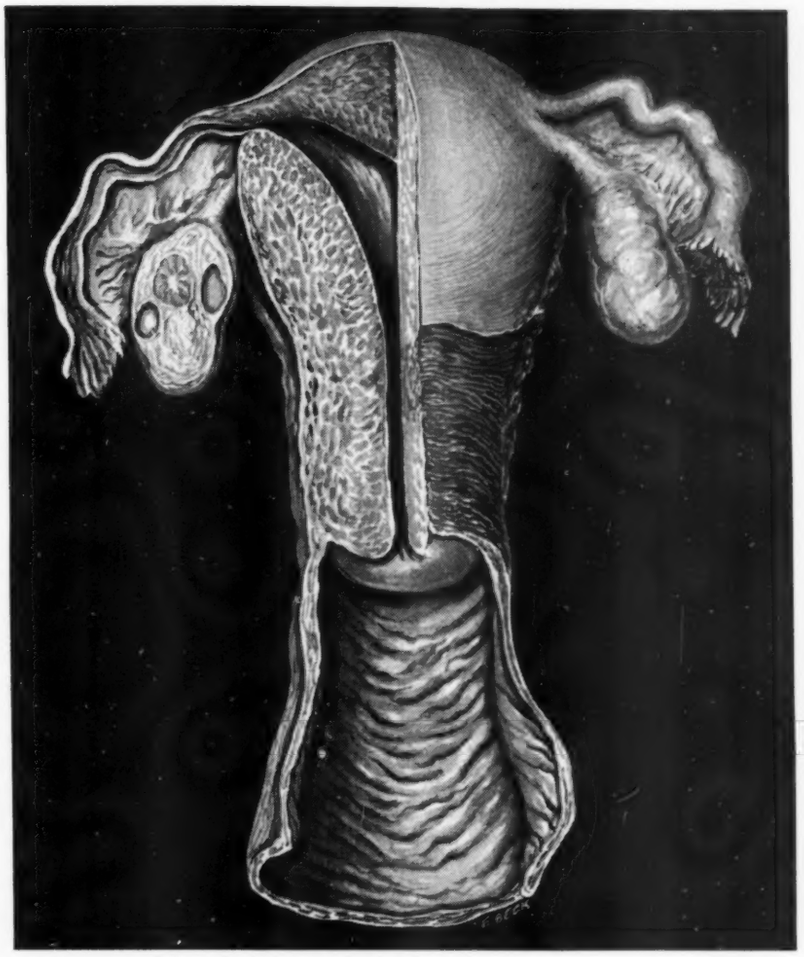
Perhaps the preceptor-preceptee relationship that Dr. Scarborough talked about is something that we are going to build up more in the future. I am talking around your question, Dr. Mulholland, but I certainly think that the business of expecting a resident who is really a mature, trained person to work for nothing is Middle Ages stuff. We have got to get away from that. The fact is that only four hospitals in this country are left who dare to offer no stipend. They are all university hospitals, I dare to say, but more and more university hospitals are offering a little bit better than a stipend.

CHAIRMAN MOON: Is not it true, Doctor, that perhaps preceptors that may be paying their preceptees a much larger amount than the hospitals are paying residents may be a deterring factor in filling residencies?

DR. MCCORMACK: This is possible, but it certainly tends to counterbalance the evidence that there are more and more private and semi-private patients and fewer and fewer ward patients.

CHAIRMAN MOON: Dr. Scarborough, have you anything to add? I think that our Society owes thanks to Drs. McCormack and Mulholland, for giving of their time to come before us.

VALLESTRIL® IN ESTROGEN THERAPY



Vallestril, brand of methallenestril, insures maximal estrogenic potency with minimal activity on the endometrium and thus singular freedom from withdrawal bleeding.

"Target Action" Avoids Withdrawal Bleeding

Vallestril has been found to exert its selective "target action" on the vaginal mucosa. Conversely the effect on the uterus or endometrium is negligible.

In pharmacologic studies, using the Allen-Doisy technic, Vallestril was found to be more active than estradiol and twice as potent as estrone on the vaginal mucosa. On the other hand, using the Rubin technic, Vallestril was found to have only one-tenth the activity of estrone on the uterus, a suggested explanation of its low incidence of withdrawal bleeding.

In clinical evaluation, covering a period of two and one-half years, Vallestril was found* to be "an effective synthetic estrogen . . . singularly free from toxic effects and complications, especially uterine bleeding. . . . The beneficial effect of the medication appeared within three or four days in most menopausal patients . . . . failure to encounter withdrawal bleeding in any patient was most gratifying. . . ."

Such unwanted reactions as nausea, mastalgia and edema also occur less frequently with Vallestril.

Vallestril is preferentially indicated whenever estrogens are of value: The menopausal syndrome; pain of postmenopausal osteoporosis; pain of osseous metastases of prostatic cancer.

Dosage: Menopause—3 mg. (1 tablet) two or three times daily for two or three weeks, followed by 3 or 6 mg. daily for one month. Supplied only in scored tablets of 3 mg. G. D. Searle & Co., Research in the Service of Medicine.

---

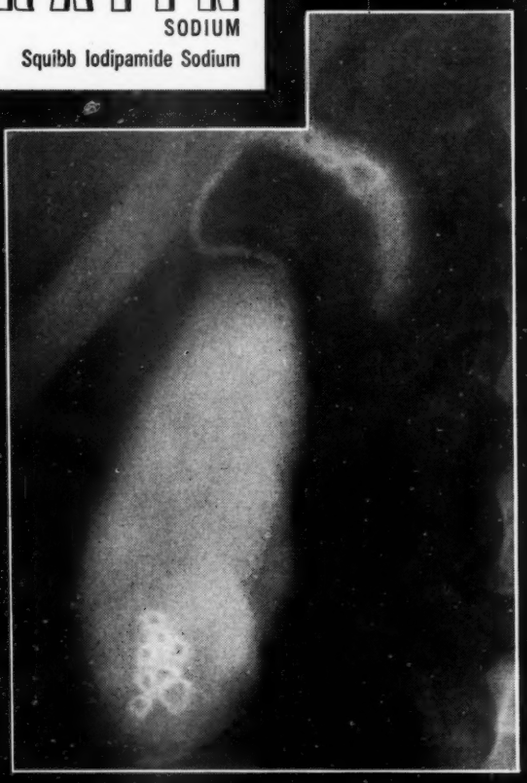
*Sturnick, M. I., and Gargill, S. L.: New England J. Med. *247*:829 (Nov. 27) 1952.

SEARLE

new intravenous technic for more comprehensive biliary duct radiography

CHOLOGRAFIN
SODIUM

Squibb Iodipamide Sodium



a valuable preoperative measure
to visualize suspected or unsuspected calculi in the hepatic and common ducts

in persisting postcholecystectomy complaints
to demonstrate common duct stones and residual duct stumps

a more efficient radiographic technic
to depict the gallbladder and/or common duct even when oral contrast media fail, or when oral media cause nausea and vomiting

SQUIBB

"CHOLOGRAFIN" IS A SQUIBB TRADEMARK

CHO-56

IN ELECTROSURGERY ONE NAME STANDS OUT

Bovie

The new "AG" Bovie . . . a new concept of electro-surgical excellence!

THE *Only* ELECTROSURGICAL UNIT THAT PROVIDES *BOTH* TUBE AND SPARK-GAP CUTTING!

It's the one unit that satisfies every surgeon in every hospital, no matter what the technique! Learn the details of its advanced engineering, better performance, safety and dependability —features that have made it the outstanding electrosurgical apparatus on the market!

GET INFORMATION ALSO ON THE NEW L-F EXPLOSION-PROOF FOOTSWITCHES NOW OFFERED BOVIE USERS.

• THE MODEL "AG" BOVIE IS THE GREATEST OF THEM ALL!

Mail the coupon today for 6-page illustrated brochure describing this outstanding unit!

L-F *Send* FOR LITERATURE

LIEBEL-FLARSHEIM CO., CINCINNATI 15, OHIO

Gentlemen:

☐ Please supply me, without obligation, your latest illustrated brochure on the Model "AG" Bovie.

☐ Please give me information on your Explosion-Proof Footswitches.

NAME_____

ADDRESS_____

CITY-STATE_____

ORAL PENICILLIN: A CHALLENGE ANSWERED

Through the years, the paradox of penicillin has been this—that while injectable forms have become the sheet anchor of antibiotic therapy, oral forms have all too often posed perplexing problems.

How to ensure survival in gastric acid? How to get maximal absorption? How to increase the antibacterial effect? How, indeed, to realize the hope at the dawn of the penicillin era that the oral route might even merit selective preference?

These have been the challenges. Out of them has come PEN·VEE·*Oral*—a remarkable innovation among oral penicillins. For PEN·VEE·*Oral* is penicillin V, the unique penicillin stable as a free acid—a penicillin with such special characteristics that it opens new horizons in oral penicillin therapy.

Because PEN·VEE·*Oral* is acid-stable, it is almost entirely unaffected by gastric juices. Because it is completely soluble in alkaline media, it is readily and optimally absorbed as active penicillin in the duodenum. Clinical results include prompt, high blood levels, maximal effect from the administered dose, a wide margin of toleration.

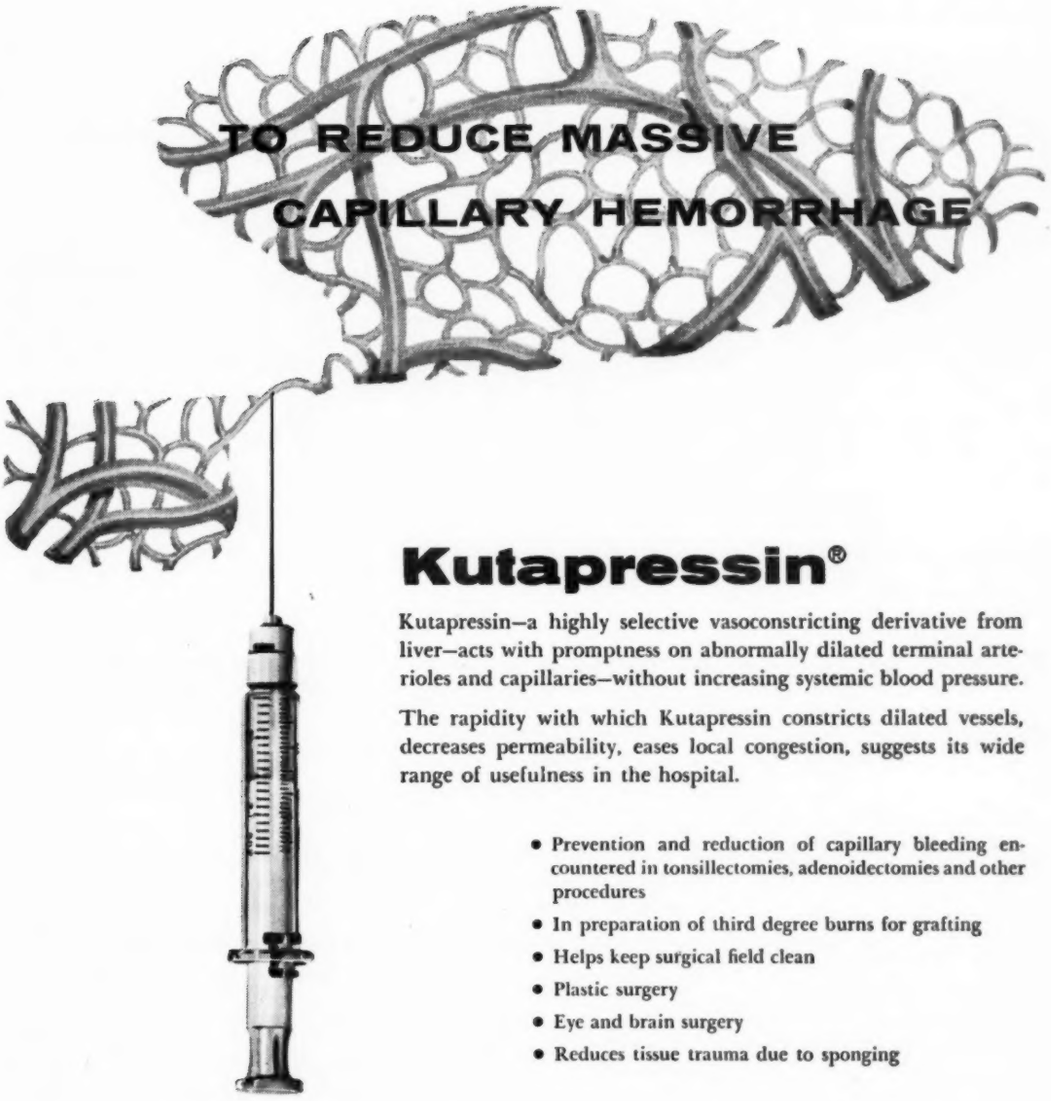
For these striking advantages, acquaint yourself with PEN·VEE·*Oral* in your practice.

Supplied: Tablets, 125 mg. (200,000 units) each, bottles of 36. Also available: BICILLIN®-Vee Tablets, 100 mg. (100,000 units) benzathine penicillin G and 62 5 mg. (100,000 units) penicillin V, bottles of 36.

PEN·VEE·*Oral**

Penicillin V, Crystalline
Phenoxymethyl Penicillin
*Trademark

Wyeth®
PHILADELPHIA, PA.



Kutapressin®

Kutapressin—a highly selective vasoconstricting derivative from liver—acts with promptness on abnormally dilated terminal arterioles and capillaries—without increasing systemic blood pressure.

The rapidity with which Kutapressin constricts dilated vessels, decreases permeability, eases local congestion, suggests its wide range of usefulness in the hospital.

- Prevention and reduction of capillary bleeding encountered in tonsillectomies, adenoidectomies and other procedures
- In preparation of third degree burns for grafting
- Helps keep surgical field clean
- Plastic surgery
- Eye and brain surgery
- Reduces tissue trauma due to sponging

No systemic side reactions have been observed following its use.
It is free from protein material, is not antigenic, is well tolerated.
No untoward effects have ever been reported.

Kutapressin may be administered intramuscularly or subcutaneously.

Supplied: Aqueous Solution, 2 cc. ampuls; 10 cc., 20 cc. multiple-dose vials.

Send for literature and samples

Ethical Pharmaceuticals Since 1894

KREMERS-URBAN COMPANY **MILWAUKEE 1, WISCONSIN**

Prescribe with Confidence

in keeping with your professional standards . . .

NO HALFWAY MEASURES IN SURGERY

WITH

Diaparene® CHLORIDE

SURGICAL SOLUTION

(A PRE-AUTOCLAVE ANTISEPTIC RINSE)

In a comparative control study, preautoclaved antibacterial rinsing of surgical caps and gowns with Diaparene Chloride (1:5000), a non-volatile antiseptic, prevented contamination of the operative field by the passage of bacteria through surgical linen wet from perspiration in 89% of the cases tested. Neither toxic nor allergic reactions were noted. Recommended usage: four ounces per 100 lbs. dry weight; supplied in 5 gallon carboys.

•

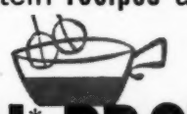
The Surgical Linen Division of many Diaparene diaper services (check classified phone book) offers preautoclave rinsing with Diaparene Chloride as an approved hospital service.

1 Collette, T.S.: Editorial—False Faith in the Surgeon's Gown and Surgical Drape: Am. J. Surg., 83:125-126, 1952.
2. Propst, H.D.: The Effect of Bactericidal Agents on the Sterility of Surgical Linen; Am. J. Surg. 86:301-308, 1953.
3. Colebrook, L. and Hood, A.M.: Infection Through Soaked Dressings: Lancet, 2:682, 1948.
4. Silverstein, M.E., New York City, N.Y., Personal Communication, November 10, 1952.
5. Baker, E., Madden, J.L. and Hartz, M., New York City, N.Y., Personal Communication, November 29, 1954.

Professional samples and literature available on antibacterial Diaparene Chloride Surgical Solution, dusting powder, lotion, water-miscible ointment and water-repellent creme.

PHARMACEUTICAL DIVISION, HOMEMAKERS' PRODUCTS CORPORATION • NEW YORK 10, NEW YORK • TORONTO 10, CANADA

high-protein recipes using



GEVRAL* PROTEIN

Geriatric Vitamin-Mineral-Protein Supplement Lederle

For the patient on a high-protein diet, GEVRAL PROTEIN is an excellent supplement. In addition to 60% protein, it supplies 26 vitamins and minerals in a dry powder that can be added to many beverages and foods. Here are some suggested recipes:

simple drinks Blend 1 heaping tbsp. GEVRAL PROTEIN with small amount of milk or orange juice; make smooth paste; stir in additional milk or juice to make 8 oz. For chocolate milk, prepare milk drink, then add 1-2 tbsp. chocolate syrup. For hot cocoa, add 1 heaping tbsp. GEVRAL PROTEIN to instant cocoa powder in cup; add small amount of hot water, make smooth paste; stir in enough water to fill cup.

special drinks Vanilla Milk, 4 heaping tbsp. GEVRAL PROTEIN, 1 pint cool water, 1 cupful skim milk, 1 tbsp. sugar, ½ tsp. vanilla. Mix with rotary beater. Serve hot or cold. Makes 4 servings.

Chocolate Malted Milk. 1 heaping tbsp. GEVRAL PROTEIN, 1 tbsp. chocolate malt powder, 1 tsp. sugar, 1 glass whole milk. Mix with rotary beater. Makes 1 serving.

Egg Nog. 4 heaping tbsp. GEVRAL PROTEIN, 3 cups cool water, 1 tbsp. sugar, 2 well beaten eggs, ½ tsp. vanilla. Mix with rotary beater. Makes 4-5 servings.

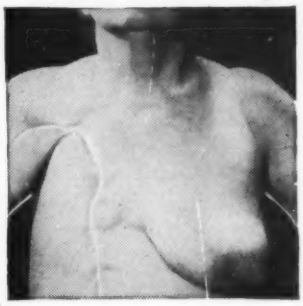
other foods Soups. Place 1 heaping tbsp. GEVRAL PROTEIN in saucepan. From ¾ cup of water, take enough to make smooth paste. Stir in remaining water, then ½ can of cream of mushroom, chicken, asparagus, or celery soup.

Cereals. One heaping tbsp. GEVRAL PROTEIN can be mixed with ½ cup hot cereal during or after cooking. Add sugar, milk, or cream to taste.

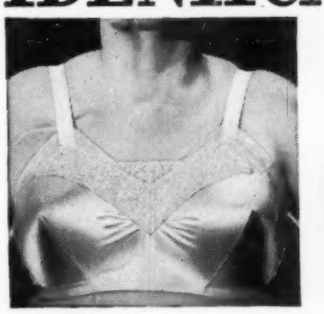
LEDERLE LABORATORIES DIVISION
AMERICAN Cyanamid COMPANY Pearl River, New York
*REG. U.S. PAT. OFF.

Lederle

after Mastectomy only



IDENTICAL® *form*



a "surprisingly simple"

breast form

restores Normal Contour
Natural Alignment
Life-like Motion
Self Confidence

through balancing weight compensation and natural fluidity of motion

adaptable to any brassiere, even bathing suit

Recommended by leading doctors because of its excellent cosmetic results and its ability to meet the patient's previously overlooked physiological needs.

Available in 24 sizes. Expertly fitted in leading stores throughout the United States and Canada

Patented U.S.A. & Foreign Countries

IDENTICAL FORM, INC.
17 West 60 St., New York 23, N.Y.
Please send professional literature and list of authorized dealers.

.....M.D.

Address.....

City.....Zone.....State..... JS

Sulfasuxidine®

SUCCINYLSULFATHIAZOLE

gave her smooth recovery from bowel surgery

MAJOR ADVANTAGES: Markedly reduces intestinal coliforms.[1] Notably nontoxic. Aids in mechanical preparation of G. I. tract for surgery.

"The most satisfactory of the bacteriostatic sulfonamides available as an intestinal antiseptic,"[2] SULFASUXIDINE reduces operative risk, permits smoother and faster recovery.

SULFASUXIDINE has become part of preoperative and postoperative routine in bowel surgery. It reduces flatulence and minimizes risk of local infection. Postoperatively, healing "proceeds rapidly...simulates primary tissue repair."[2]

Because systemic absorption is limited, the effect of SULFASUXIDINE is concentrated in the gut and the possibility of any untoward reaction is slight.[2]

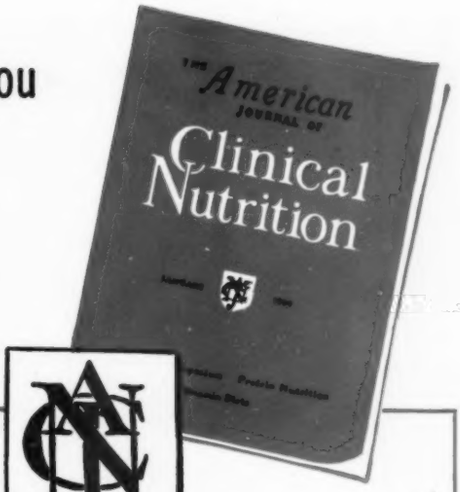
Supplied as 0.5 *Gm.* tablets or as a powder in ¼-lb. and 1-lb. bottles. *Dosage* is 0.25 *Gm.* per Kg. of body weight daily.

SHARP & DOHME

Philadelphia 1, Pa.
DIVISION OF MERCK & CO., INC.

References: 1. Pharmacology and Therapeutics, ed. 2, Phila., Lea & Febiger, 1954, p. 452. 2. J.A.M.A. 153:1516, 1953.

Published exclusively to help you meet the **DIETARY PROBLEMS** of your patients because—



the TOTAL CARE of every patient includes **NUTRITION**

Responsibility for management of the dietary problems of your patients rests upon you regardless of your specialty in medicine or surgery. THE AMERICAN JOURNAL OF CLINICAL NUTRITION is the only journal of its kind published exclusively in the interests of helping the family physician or specialist include nutrition as part of the TOTAL CARE of his patient. In this important journal—written authoritatively—are data presented from the practical aspect of helping you meet the nutritional needs of your patient under medical or surgical treatment. Keep yourself informed of the new advances in clinical nutrition by sending your subscription now for this *practical* and *permanently useful* journal.

for practical application of NEW advances in nutrition by

- **OBSTETRICIAN**
- **PEDIATRICIAN**
- **INTERNIST**
- **SURGEON**
- **GERIATRICIAN**
- **FAMILY PHYSICIAN**

THE AMERICAN JOURNAL OF CLINICAL NUTRITION

Editor-in-Chief

S. O. WAIFE, M.D., F.A.C.P., ASSOCIATE IN MEDICINE, INDIANA UNIV. MED. SCHOOL

SUBSCRIBE NOW!

Use this handy coupon

THE AMERICAN JOURNAL OF CLINICAL NUTRITION
49 W. 45th Street, New York 36, N. Y.

Gentlemen: Kindly enter my subscription for 6 issues (one year) of THE AMERICAN JOURNAL OF CLINICAL NUTRITION AT $6.00*

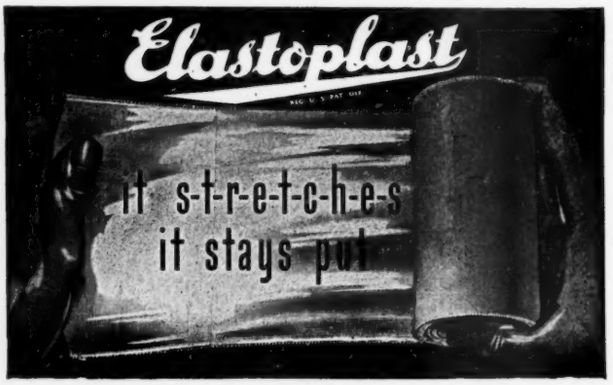
☐ I enclose remittance ☐ Please bill me

Name_____

Address_____

City_____ Zone_____ State_____

*Canada, Central and South America $6.50; other foreign $7.00



For
Comfort . . .
Neatness . .
For
Support . . .
Compression

The Dependable Original
E-L-A-S-T-I-C
Adhesive Bandage

ELASTOPLAST

Trade Mark

Molds and holds to any contour . . . Allows joint motion . . . Provides firm support and controllable compression . . . Does not slip. Assures the neatest, most comfortable dressing in private and hospital practice. Available at your dealer in widths of 1, 2, 2½, 3, 4, 5 and 6 inches, 3 yards long (slack).

* Elastoplast is also available in convenient unit dressings and compresses. Write for literature.

DUKE LABORATORIES, INC.
STAMFORD, CONN.

Your valued hands, Doctor, *NEED*

Acid Mantle Creme

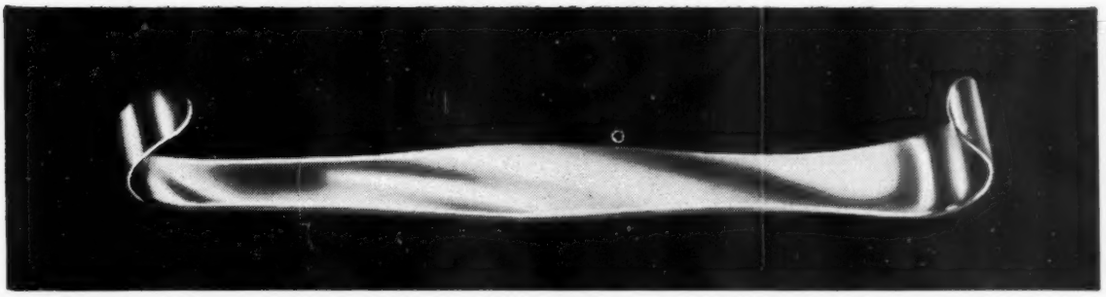
to prevent SCRUB DERMATITIS

A Therapeutic—A Prophylactic
NOT a Barrier Cream

ACID MANTLE CREME—a buffered solution of aluminum acetate in a specially formulated hydrophilic base with a dermatologically correct pH of 4.2

For skin diseases in which there is an increased pH of the skin surface and/or a hypersensitivity to alkali, such as: Dermatitis of the hands in Surgeons, occupational Eczema due to primary irritants including soap and alkalis, Nummular Eczema, Bath Dermatitis, Winter Itch, Dry Skin and Seborrheic Dermatitis. *Write for Literature and Samples*

DOME CHEMICALS INC.
109 WEST 64th STREET, NEW YORK 23, N. Y.



Above, A TILLARY RETRACTOR OF POLISHED STAINLESS STEEL

Above, THE SAME RETRACTOR WITH THE NEW WECK G-P FINISH

Note the difference in glare!

new!

WECK G-P FINISH

—the Glare-Proof Finish for Surgical Instruments

Even under normal conditions in the operating room, the glare of surgical instruments has been a problem. But with the development—especially in teaching hospitals—of the use of movie and television cameras requiring lights up to 16,000 watts—the problem becomes acute.

After many months of experimenting, Weck has produced a finish which tests have shown to be superior to the so-called "satin" and "black" finishes. This GLARE-PROOF finish has been achieved without sacrifice to the corrosion-resistant and ease of cleaning properties of the standard Weck stainless steel. Your inquiries are invited.

65 years of knowing how

EDWARD WECK & CO., INC.

135 JOHNSON ST., BROOKLYN 1, N. Y.

Manufacturers of Surgical Instruments • Hospital Supplies • Instrument Repairing

now available in two potencies

FLAXEDIL*

Gallamine Triethiodide *Lederle*

for relaxation of skeletal muscle

Regular FLAXEDIL
20 mg./cc., 10 cc. vial.
Suited for inclusion with intravenous drip anesthesia during long surgery.

new! High potency
FLAXEDIL 100 mg./cc.,
1 cc. ampul.
Administered directly.
May be mixed in syringe with barbiturates.
Convenient, time-saving.

*REG. U. S. PAT. OFF.

LEDERLE LABORATORIES DIVISION AMERICAN Cyanamid COMPANY Pearl River, New York

Lederle

'... keep my temper down'

Statement from an emotionally unstable farm boy who received Serpasil in a recent study. This patient was 1 of 3 individuals with some form of character neuroses who were treated with Serpasil.

Drake, F. R., and Ebaugh, F. G.: Ann. New York Acad. Sc. *61*:198 (April 15) 1955.

'... calm and easier to get along with'

Wife's comment regarding a 43-year-old rancher suffering from a prolonged mild hypomanic reaction who was placed on 0.75 mg. of oral reserpine (Serpasil) daily for 5 months. She told the investigators that without Serpasil it would be intolerable for her to live with him.

Drake, F. R., and Ebaugh, F. G.: Ann. New York Acad. Sc. *61*:198 (April 15) 1955.

Complaints in elderly "diminished in number"

Harris found that the effect of oral reserpine (Serpasil) was to diminish complaints typical of elderly people not in the best of health. The majority of 26 patients studied expressed a feeling of well-being and appeared calmer; there was also less difficulty in sleeping.

Harris, R.: Ann. New York Acad. Sc. *59*:95 (April 30) 1954.

'Whenever I run out of Serpasil my tension headaches come back'

Typical comment from a patient when asked to describe the effect of Serpasil; patients suffering from anxiety states with minimal or no depressive features showed moderate to marked improvement on dosages varying from 0.25 mg. to 2.5 mg. of oral reserpine daily.

Drake, F. R., and Ebaugh, F. G.: Ann. New York Acad. Sc. *61*:198 (April 15) 1955.

Supplied: *Tablets*, 0.1 mg., 0.25 mg. (scored), 1.0 mg. (scored), 2.0 mg. (scored), 4.0 mg. (scored). *Elixir*, 0.2 mg. per 4 ml. *Parenteral Solution*, 2-ml. ampuls, 2.5 mg. per ml.

PSYCHIATRIC USE ONLY: *Elixir*, 1.0 mg. per 4 ml.

Serpasil®

(reserpine CIBA)

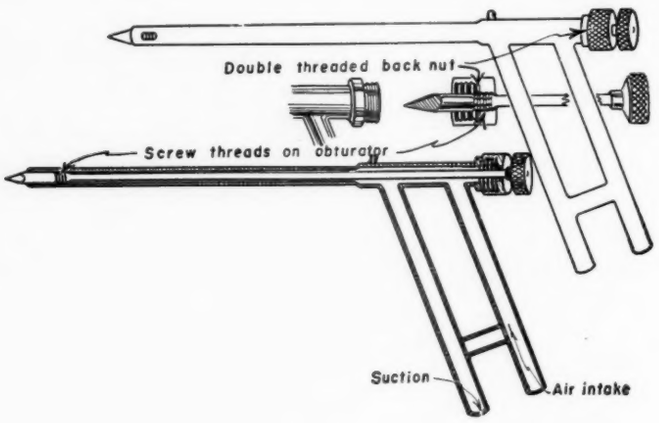
C I B A Summit, N. J.

2/2188M

MEDICAL HORIZONS TV Monday P.M. *Sponsored by* CIBA ABC-TV

SIMPLER EFFECTIVE MANAGEMENT OF ACUTE SMALL BOWEL OBSTRUCTION

WITH THE BARNES SUCTION TROCAR



In a technique that prevents evisceration and increases both working space and ease of maneuverability in the operative field, the Barnes suction trocar simplifies management of acute small bowel obstruction with relatively no increase of any existing shock.

The Barnes procedure simply and effectively removes both gas and fluid from distended bowel segments to leave a collapsed bowel right down to the point of obstruction. Whatever must then be done can be done easily and under comfortable, controlled conditions, with far less risk than otherwise.

A complete description of this procedure, which converts many a trying, hazardous and technically difficult operation into a relatively simple and easy one, appears in ARMAMENTARIUM, Volume II, Number V. If you have not yet received your copy of this interesting surgical bulletin, we will gladly send it to you upon request.

The Barnes Suction Trocar—which received considerable attention at the recent surgical meetings—is stainless steel, in one size only. Place your order now. Each, **$40.00**

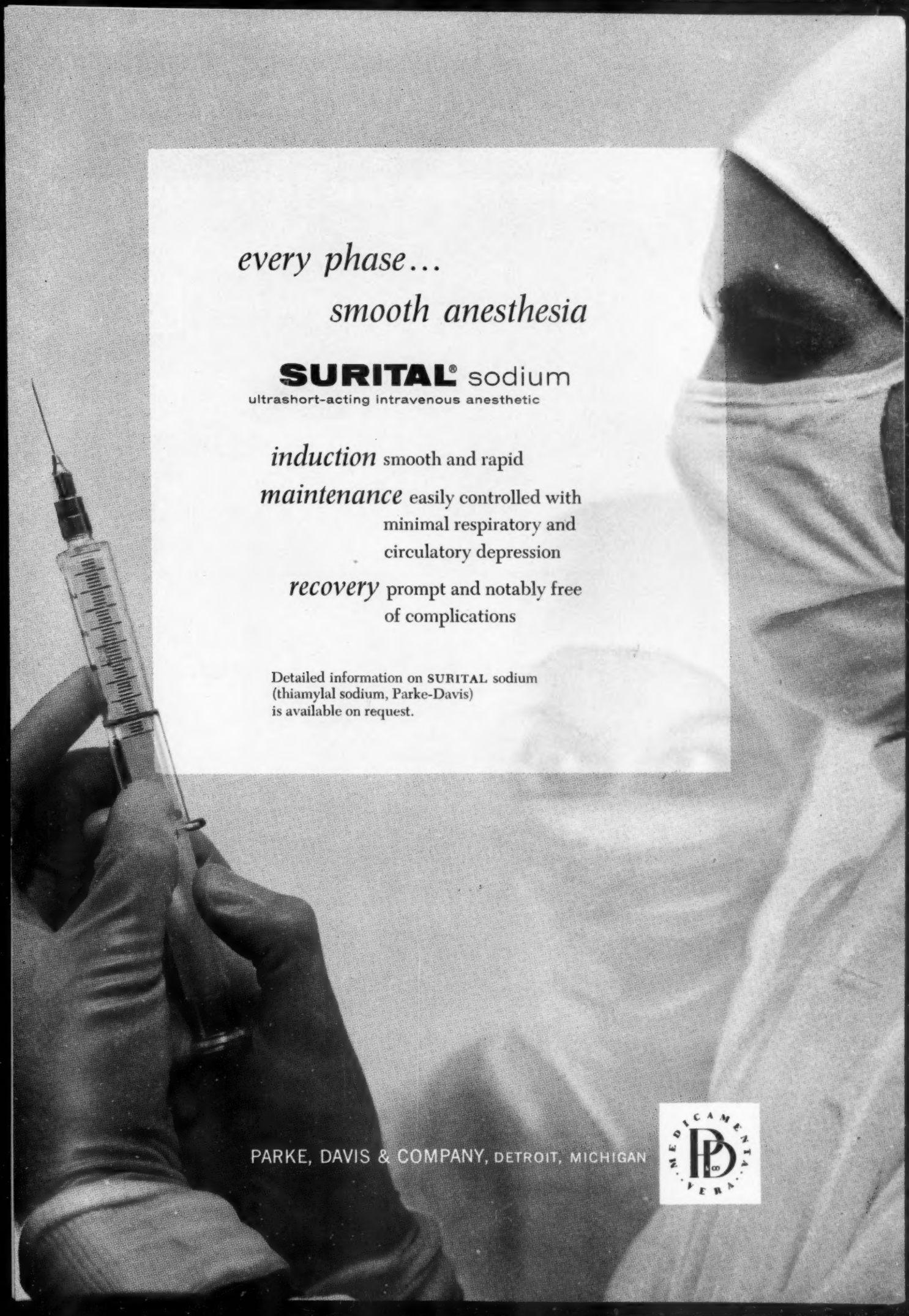
Instrument Makers To The Profession Since 1895

V. Mueller & Co.

330 SOUTH HONORE STREET **CHICAGO 12, ILLINOIS**

Branches Now In

DALLAS, TEXAS — HOUSTON, TEXAS — ROCHESTER (MINN.) — CHICAGO


every phase...
smooth anesthesia
SURITAL® sodium
ultrashort-acting intravenous anesthetic
induction smooth and rapid
maintenance easily controlled with minimal respiratory and circulatory depression
recovery prompt and notably free of complications
Detailed information on SURITAL sodium (thiamylal sodium, Parke-Davis) is available on request.
PARKE, DAVIS & COMPANY, DETROIT, MICHIGAN
MEDICAMENTA VERA

Upjohn

preoperative bowel preparation within 24 hours:

Mycifradin *tablets*

Trademark for the Upjohn brand of neomycin

Each tablet contains 0.5 Gm. neomycin sulfate (equivalent to 0.35 Gm. neomycin base). In bottles of 20 tablets.

Also available:

Mycifradin Sulfate Powder (topical) in vials of 0.5 Gm. and 5 Gm.

Mycifradin Sulfate (intramuscular) in vials of 0.5 Gm.

THE UPJOHN COMPANY, KALAMAZOO, MICHIGAN

postpartum

routine in the six-week checkup

A GENERAL PHYSICAL, including blood and urine

B THOROUGH PELVIC EXAMINATION

C CONTRACEPTIVE COUNSEL

SIMPLE, EFFECTIVE CONCEPTION CONTROL

Ortho

COOK COUNTY
GRADUATE SCHOOL OF MEDICINE

INTENSIVE POSTGRADUATE COURSES

STARTING DATES—WINTER, 1955–56

SURGERY—Surgical Technic, Two Weeks. November 28, January 23

Surgical Anatomy & Clinical Surgery, Two Weeks, March 5

Surgery of Colon & Rectum, One Week, November 28, February 27

General Surgery, One Week, February 13; Two Weeks, April 23

Basic Principles in General Surgery, Two Weeks, April 9

Gallbladder Surgery, Ten Hours, April 9

Fractures & Traumatic Surgery, Two Weeks, March 12

GYNECOLOGY—Office & Operative Gynecology, Two Weeks, November 28, February 13

Vaginal Approach to Pelvic Surgery, One Week, December 12, February 6

OBSTETRICS—General & Surgical Obstetrics, Two Weeks, February 27

MEDICINE—Internal Medicine, Two Weeks, May 7

Electrocardiography & Heart Disease, Two-Week Basic Course, March 12

Gastroscopy, Forty-Hour Basic Course, March 19

Dermatology, Two Weeks, May 7

RADIOLOGY—Diagnostic X-Ray, Two Weeks, January 9

Clinical Use of Radioactive Iodine, One Week, April 2

Clinical Uses of Radioisotopes, Two Weeks, May 7

PEDIATRICS—Intensive Review Course, Two Weeks, April 9

UROLOGY—Two Week Course, April 16

Cystoscopy, Ten Days, by appointment

TEACHING FACULTY—ATTENDING STAFF

of Cook County Hospital

Address Registrar, **707 South Wood Street, Chicago 12, Illinois**

THE NEW YORK POLYCLINIC
MEDICAL SCHOOL AND HOSPITAL

(ORGANIZED 1881)

(The Pioneer Post-Graduate Medical Institution in America)

OBSTETRICS AND GYNECOLOGY

A two months full time course. In Obstetrics: lectures, prenatal clinics; witnessing normal and operative deliveries; operative obstetrics (manikin). In Gynecology: lectures, touch clinics; witnessing operations; examination of patients pre-operatively; follow-up in wards post-operatively. Obstetrical and gynecological pathology. Anesthesia. Attendance at conferences in obstetrics and gynecology. Operative gynecology (cadaver).

UROLOGY

A combined full time course covering an academic year (8 months). It comprises instruction in pharmacology; physiology; embryology; biochemistry; bacteriology and pathology; practical work in surgical anatomy and urological operative procedures on the cadaver; regional and general anesthesia (cadaver), office gynecology; proctological diagnosis; the use of the ophthalmoscope; physical diagnosis; roentgenological interpretation; electrocardiographic interpretation; dermatology and syphilology; neurology; physical medicine; continuous instruction in cysto-endoscopic diagnosis and operative instrumental manipulation; operative surgical clinics; demonstrations in the operative instrumental management of bladder tumors and other vesical lesions as well as endoscope prostatic resection. Attendance at departmental and general conferences.

EYE, EAR, NOSE and THROAT

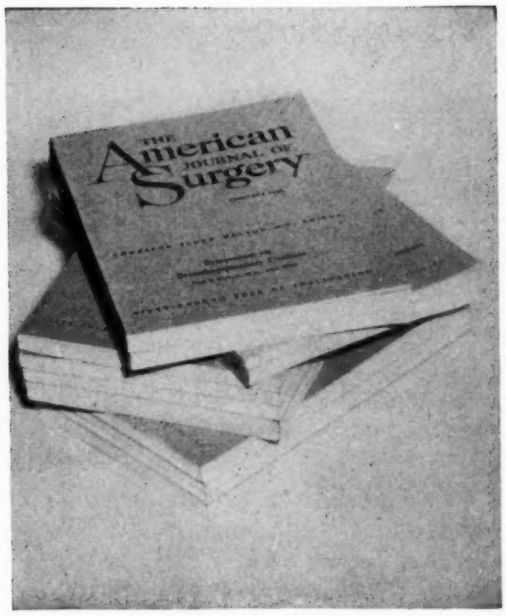
A combined full-time course covering an academic year (9 months). It consists of attendance at clinics, witnessing operations, lectures, demonstration of cases and cadaver demonstrations; operative eye, ear, nose and throat (cadaver); head and neck dissection (cadaver); clinical and cadaver demonstrations in bronchoscopy, laryngeal surgery and surgery for facial palsy; refraction; radiology; pathology; bacteriology; embryology; physiology; neuro-anatomy; anesthesia; physical medicine; allergy; examination of patients pre-operatively and follow-up post-operatively in the wards and clinics. Also refresher courses (3 months).

PROCTOLOGY AND GASTROENTEROLOGY

A combined course comprising attendance at clinics and lectures; instruction in examination, diagnosis and treatment; witnessing operations; ward rounds, demonstration of cases; pathology; radiology; anatomy; operative proctology on the cadaver attendance at departmental and general conferences.

FOR INFORMATION ABOUT THESE AND OTHER COURSES ADDRESS

THE DEAN, 345 West 50th Street, NEW YORK 19, N. Y.



Back Issues Wanted

(MUST BE IN GOOD CONDITION)

THE AMERICAN JOURNAL OF SURGERY

will pay $1.00 per copy for the following issues:

March 1952 — May 1952

April 1952 — November 1, 1950

January 1950

Send to

The American Journal of Surgery, Inc.
49 West 45th Street New York 36, N. Y.

Precision

IS IN THE BALANCE

...the Sharpness...the Strength

To meet the surgeon's need for PRECISION-dependability, every Crescent Blade is

- precision-made for fine balance
- precision-honed for extreme sharpness
- precision-tested for strength and rigidity
- precision-protected by the new moisture-proof, all-climate, aluminum-foil wrapping

Use of a new Swedish steel of high carbon content and unusually fine grain assures precision-performance in every "Master Blade" for the Master Hand.

Samples on Request

CRESCENT SURGICAL SALES CO., INC.
48-41 Van Dam, Long Island City 1

Crescent

SURGICAL BLADES AND HANDLES

Preferred for

precision and performance

BARD-PARKER
RIB-BACK
SURGICAL BLADES

It's Sharp

BARD-PARKER RIB-BACK SURGICAL BLADES are preferred by the Profession . . . because they know that each blade, through continuous inspection—meets every specification.

And, there are other traditionally good reasons why there is a preference for B-P RIB-BACK SURGICAL BLADES . . . they are *always* dependable and highly economical in performance.

Ask your dealer

BARD-PARKER COMPANY, INC.
Danbury **Connecticut, U.S.A.**

Requirements for Postgraduate Training in Proctology and Available Positions for Residency

CANDIDATES desiring certification by the American Board of Proctology (colonic and anorectal surgery) may be admitted to examination following satisfactory completion of the requirements set forth below. Requirements of the Board for approved residencies correspond to those of the Council on Medical Education and Hospitals of the American Medical Association and the American College of Surgeons.

A candidate for a Proctologic residency approved by the Board must be a graduate of a medical school approved by the Council on Medical Education and Hospitals, and must have served an internship of at least one year in a hospital acceptable to that Council. In addition, he must have had specific training in general surgery after internship, including instruction in the basic sciences according to standards prescribed by the Board.

An applicant for examination leading to certification by the American Board of Proctology may qualify by any one of three methods: (1) two years of approved general surgical residency and two years of approved residency in proctology (colonic and anorectal surgery); (2) three years of approved general surgical residency, plus two years of an approved precepteeship in proctology (colonic and anorectal surgery); (3) two years of approved residency in general surgery, plus three years of approved precepteeship in proctology (colonic and anorectal surgery).

The following residencies are approved by the American Board of Proctology for training:

1. University of Minnesota Hospitals
2. Ferguson-Droste-Ferguson Rectal Clinic and Hospital
3. Mayo Foundation
4. Millard Fillmore Hospital
5. Youngstown Hospital
6. Allentown Hospital
7. White Memorial Hospital (Los Angeles)
8. Temple University Hospital
9. Pittsburgh Medical Center
10. Baylor University Hospital
11. Ochsner Medical Foundation Hospital

STUART T. ROSS, M.D., *Secretary*,
American Board of Proctology,
520 Franklin Ave.,
Garden City, N. Y.

NOTES AND QUOTES

"MEDICAL security in some form is coming in America, just as social security has been established," according to Dr. Willard C. Rappleye, Dean of Columbia University's Faculty of Medicine. In his annual report for the fiscal year ending June 30, 1955, Dean Rappleye declared that the American people are "determined that the results of modern scientific knowledge be made available to the entire population."

Noting that more than 103 million Americans now have some type of voluntary prepayment hospital and medical care insurance, he declared that "this phenomenon is already having a profound impact upon hospital and medical practice and presents a great challenge to the profession . . . because ultimately there will be regulation of benefits and premiums. The solution will require ingenuity and imagination if the high level of health care now provided for large, though not all, elements of the population is to be preserved and at the same time avoid the level of mediocrity which might follow any scheme of regimentation."

In other comments on the social and economic aspects of modern medicine and medical education, the Columbia Dean:

1. Insisted that medical schools should be free "from the hampering regulations of the medical profession or restrictive legislation which might interfere with their essential functions in a modern society." He stated that recent efforts of the medical profession to regulate methods of compensation for teachers in medical schools present "a real challenge to medical education."

2. Urged continuous financial support by industry of medical education and research, pointing out that one-fortieth of 1 per cent of the annual net profits of American industry before taxes, "would underwrite the present deficits of the medical schools of the country."

3. Contended that it is "the American way" to meet the previously mentioned challenge through voluntary methods. The alternatives, he warned, might include "government support with some degree of control and direction or the further growth of proprietary and hospital medical schools."

Commenting on the national supply of physicians, Dean Rappleye noted that there are approximately 225,000 physicians in the United States, a ratio of one to about 750 people.

"This ratio is approximately sufficient in total," he asserted, "if all of the doctors were adequately trained, better distributed and more effectively utilized in relation to actual needs.

One of the major problems is the proper location of our present supply of physicians, excessive numbers of whom are now concentrated in the large urban areas.

"It is of importance to note that during the last forty-five years the number of medical graduates has risen 117 per cent while the population grew 76 per cent. The output of the medical schools at the present time is increasing more rapidly than the population, which is gratifying. The total numbers are only a part of the picture, however, because the quality and competence of doctors is a far more important aspect of proper medical care than mere numbers."

A large and profusely illustrated catalog on "Therapeutic Furniture and Equipment" designed by Bailey for Jay L. Warren, Inc., has recently been released. It should be of interest to those specializing in occupational and physical therapy, speech departments, kindergarten playrooms, adult rehabilitation and home care.

The following items are typical of the equipment contained in the new catalog: Relaxation chairs—tray combinations, also available in kit form; feeding board with dish and cup; basic chairs, in both kindergarten and adult sizes, modifications with crotch and waist straps, adjustable foot board and skis, etc. Also individual and multiple cut-out tables; elevating speech table and mirror for use in speech departments; physical therapy stools and various treatment tables.

Ambulatory aids include parallel bars, stride guides, safety training stairs, curb blocks, posture mirrors, wheelchair training stools, standing stabilizers, tripod-crab crutch and long skis with poles. There are also finger-shoulder ladders, shoulder wheels, arm support cranes, and other similar equipment.

The entire line was designed by Bailey, with

CONTINUED ON PAGE 56

DePuy HAND CHISEL SET

A newly designed set of nine chisels and a mallet, particularly adapted for hand and foot surgery. Highest quality stainless steel for lasting sharpness. Chisels have long handles for firm grip, are well balanced for safe, sure handling. Stainless steel mallet has good balance, wide striking face. No. 629 (complete set in handy carrying case).

WRITE FOR COMPLETE CATALOG!

our 60th year 1895 1955 DePuy

DEPUY MANUFACTURING CO., INC.
WARSAW 4, INDIANA

For the finest SPECIALTY instruments
CHECK WITH COCHRANE

James F. Best, Pres.

DEPENDABLE QUALITY SERVICE

L. W. McHugh, V. Pres.-Treas.

COCHRANE PHYSICIANS' SUPPLIES, Inc.
133 EAST 58th STREET NEW YORK 22, N.Y.
PHONE—PLaza 3-5533, 3-5534, 3-5491

CAMP's new skin-traction legging

A new one-piece legging tested without complication by Camp on over 1,000 patients with back and hip injuries. Simple, easy application. For use in hospital or home. Write for information.

S. H. CAMP and COMPANY, Jackson, Michigan
World's Largest Manufacturer of Anatomical Supports

SURGICAL EQUIPMENT OF SUPERIOR DESIGN AND PERFORMANCE
Indicated in
CUTTING, COAGULATION, DESICCATION

We make attachments, cords and electrodes for all types and makes of Cautery and Surgical Equipment.

Write for Descriptive Literature

COLES ELECTRONIC CORP.
1207 Race Street Philadelphia 7, Pa., U.S.A.

CHECK BACTERIAL INVASION
. . . quickly and safely . . . with *Azochloramid*®
Brand of CHLOROAZODIN U.S.P.

AZOCHLORAMID IN TRIACETIN 1:500
For moistening dressings and packings.
AZOCHLORAMID SALINE MIXTURE
To prepare an isotonic saline solution 1:3300 for irrigation, hot soaks, compresses, etc.

TRAUMATIC WOUNDS • INFECTED ULCERS
DRAINING SINUSES • DIABETIC GANGRENE

PA-15

A dependable topical adjunct to surgical debridement and systemic chemotherapy in the treatment and control of *wound infections.*

Maltbie MALTBIE LABORATORIES DIVISION
WALLACE & TIERNAN INC.
25 MAIN ST., BELLEVILLE 9, NEW JERSEY, U.S.A.

Swivel
WALKING BUTTON

Swivel Action
Self Leveling
Renewable Tips
Neat, Trim Casts

$2.75 each order today

No torsion strain

THE TOWER COMPANY, INC. - P. O. BOX 3181 - SEATTLE 14, WASHINGTON

RADIUM
RADON

SEEDS — APPLICATORS

THE RADIUM EMANATION CORP.
GRAYBAR BUILDING, NEW YORK 17, N. Y.
MURRAY HILL 3-8636

the assistance of many of the nations foremost doctors and therapists, exclusively for Jay L. Warren, Inc. For a free catalog write: Jay L. Warren, Inc., 1247–49 West Belmont Ave., Chicago 13, Illinois.

NINETEEN outstanding medical school teachers and researchers have been named recipients of the 1955 Lederle Medical Faculty Awards, as announced recently by Lederle Laboratories Division, American Cyanamid Company.

The awards, totaling $279,808 this year, are believed to be the first of their kind in the field of medical education. They are intended to supplement salaries or to help schools fill teaching or research positions, thereby helping to assure that promising medical men can afford to remain in teaching and research at the schools and universities in the preclinical departments.

The Alfred P. Sloan Foundation has announced a grant of three-quarters of a million dollars to Cornell University for the establishment of an Institute of Hospital Administration. A principal aim of the new unit will be to train a select group of students for careers in hospital administration. The program of study which will lead to the degree of Master of Public Administration in Hospital Management, or, with slightly different emphasis, to the degree of Master of Business Administration in Hospital Management, will require two years of intensive study on the campus at Ithaca, N. Y., and a year of residency in an appropriate hospital. The number annually admitted for the training will be limited to about a dozen highly qualified applicants. To insure that only the best qualified will be admitted to the course, the Foundation's grant for the new Institute has included a generous provision for fellowships.

The center will be known as "The Sloan Institute of Hospital Administration." When in full operation, the new unit intends to give as much attention to research in hospital problems as to its instructional program, a portion of the Foundation grant being earmarked for research personnel. It is also proposed to develop an extensive "in-service" program for existing hospital administrators and hospital personnel.

The grant to Cornell comes after a prolonged investigation by the Sloan Foundation, begun in 1952, into the economic position of various types of hospitals, the recruitment and training of hospital personnel and the status of research in this broad field.

In speaking of the new grant, Mr. Alfred P. Sloan, Jr., President of the Foundation, commented as follows: "For many years, this Foundation has given financial support to sizable projects in the area of industrial management which have stressed both training and research. This has been in accord with our belief that formal training of young men and women in management and business administration is a recognized university responsibility and that such training and the related research are indispensable to the progress of industry and the well-being of our society.

"This grant to Cornell for training and research in hospital administration may thus be regarded as an extension of the Foundation's long-time interest in administrative and managerial problems."

THE importance of the cytologic test for uterine cancer as a diagnostic aid in routine office practice is explained for physicians in a new exhibit available to medical groups on loan from the National Cancer Institute of the Public Health Service, U. S. Department of Health, Education, and Welfare.

The exhibit was shown for the first time at the American Medical Association meeting at Atlantic City, N. J., last June. It reports the results of the cytologic test as applied to 70,000 women in Memphis and Shelby County, Tennessee, under a project conducted by the National Cancer Institute with the cooperation of local medical and public health groups to demonstrate its value as a case-finding procedure in large populations.

The Memphis project produced a case-finding rate forty times that previously observed in the community, and 88.3 per cent of the intraepithelial carcinomas of the cervix discovered were unsuspected. Of 1,076 biopsies completed among 70,000 women tested, 544 were positive and 369 negative (the rest being borderline, suspicious or inadequate).

One of the most important facts revealed by the Memphis data was that intraepithelial

CONTINUED ON PAGE 58

for your WORK, for your PLEASURE

you need the world's tiniest precision camera—the fabulous minox

so tiny (1⅛"x3¼"x⅝"), you always carry it. so light (2½ oz.), less than your keys.

perfect candid pictures in black and white . . . and color. fast f/3.5 lens focuses as close as 8" and up to inf. all speeds from ½ sec. up to 1/1000 sec. NO FLASH NECESSARY FOR INSIDE SHOTS. USE IN OPERATING ROOM and for CASE HISTORIES. yields excellent large size prints.

minox III-S with chain and leather case $139.50

for literature—write Dept. D

KLING PHOTO CORP.

235 Fourth Avenue, New York 3, New York

SERATURE "SPUR" WOUND CLIPS

★ EASIER TO APPLY
★ EASIER TO REMOVE
★ LESS PAINFUL

Serature "Spur" clips encourage better, faster healing with improved cosmetic results. Write for free clinical trial supply.

PROPPER MANUFACTURING COMPANY, INC.

MADE IN U.S.A. BY

10-34 44th DRIVE LONG ISLAND CITY 1, N. Y.

The Primer Bandage (moist) and the Dalzoflex Bandage (elastic adhesive)—suggested in the Pressure Treatment of

LEG ULCERS, VARICOSITIES

and other ailments of the extremities where pressure is indicated. *It Costs no more to use the best!*

Catalog and Prices on Request

Medical Aids Inc.

5 North Wabash Avenue Chicago 2, Illinois

THE NEW *Richards*

ELECTRIC BONE DRILL AND SCREWDRIVER

Powerful, yet light weight. Easily controlled speeds for drilling or reaming. Cannulated head allows insertion of wires or Steinman pins. Sterilized by autoclaving.

RICHARDS MFG. CO., MEMPHIS, TENN.

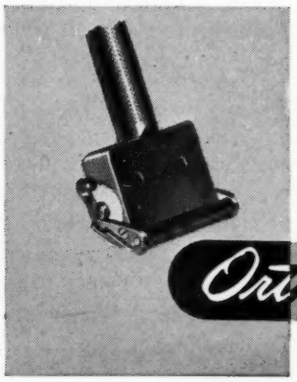
Self-Broaching *Schneider Pins* for intramedullary pinning

$11.50 each

No. 825 Pin

SIZES - 8MM - 12MM DIAMETERS

Zimmer MANUFACTURING CO., WARSAW, IND.



Stryker ROLO-DERMATOME

● *Simple, fast blade changing*
● *Requires no skin preparation*

Orthopedic FRAME COMPANY

Kalamazoo • Michigan

RADIUM RADON

SEEDS — APPLICATORS

THE RADIUM EMANATION CORP.

GRAYBAR BUILDING, NEW YORK 17, N. Y.

MURRAY HILL 3-8636

NOTES AND QUOTES

carcinoma, or preinvasive "carcinoma *in situ*" in the stage considered practically 100 per cent curable, was found most often in women of the thirty to thirty-five year old age group. Invasive cancer, on the other hand, was found most often in the fifty to fifty-five year old age group.

In addition to presenting these data, the National Cancer Institute exhibit illustrates the aspiration method of taking a vaginal smear for cytologic examination. A folder explaining this procedure in detail, which is helpful in training nurses or medical technologists, is also available from the Institute.

"Signs of the Health Times," a sixty-four-page condensation of what was said during the 1955 National Health Forum on "Forecasting America's Health," March 23rd and 24th, is now available from the National Health Council. Members of the Council, fifty national organizations interested in health betterment, conduct the Forum each spring to consider health questions of broad reach.

The report offers swift summaries of the present and expectations for the future in many areas of information that any planner of health programs must take into account, including economic trends and their probable effects on health efforts; what atomic developments mean healthwise; new miracles to expect from medical science, and how social science can help us benefit from them; the health manpower situation and NHC's Health Careers program; the role of mass communications media in health betterment; fluoridation as a unique public health case-history-in-the-making and as an opportunity to study the interaction of community health forces; what communities can do about chronic illness and probable impact of the Hoover Commission's health recommendations.

Roscoe P. Kandle, M.D., Forum Chairman, points out in the introductory pages that basically the 1956 Forum sought to erect new guideposts to more effective cooperation among the rapidly multiplying and widely varied health organizations in this country in working together for the American people.

"I feel sure we succeeded in painting useful road signs to health action both in the community and elsewhere," says Dr. Kandle.

The report is being mailed to Forum registrants. It may be secured for $1 per copy from the National Health Council, 1790 Broadway, New York 19, N. Y. Reduced prices are offered for quantities.

THE majority of physicians over sixty-five remain important and necessary members of the health teams in their communities, according to a recent poll conducted by *Medicine in the News*, a monthly publication of the Schering Corporation.

A questionnaire sent to physicians over sixty-five, the conventional age of retirement, reveals that: (1) eight of every ten are still in active practice; (2) one of every two sees more than forty patients in an average week; (3) one of every four treats patients of all ages; one of every two sees chiefly patients between the ages of forty and sixty; and (4) one of every four will handle all types of cases; three of every four do not accept surgical cases.

Comments on some of the questionnaires showed remarkable activity on the part of some physicians well over sixty-five. A Virginia physician, for example, wrote: "I am now eighty-six years old and treat about twenty-five patients a week." Another wrote: "I can now state that I have a larger practice at sixty-seven years of age than at any time in my forty years of practice." Still another made the amazing statement: "On December 24, 1954, I was ninety years old. I have been in practice sixty years. I treat forty or more patients a week, although I no longer do any surgery. Most of my patients are over forty."

Over-all results of the poll, published in the September issue of *Medicine in the News*, showed that while many physicians restrict their activities after sixty-five, general retirement at that age for the majority seems not only undesirable but impossible.

Curity Research Laboratories of Bauer & Black announce the development of Curity elastic adhesive, a new high-stretch tape distinguished by its ability to move with the skin. Curity elastic adhesive, with a stretching factor of over 55 per cent, gives complete support to injured parts, yet allows them freedom of movement.

OPERATING SPECULUM

OVAL SHAPE FOR EASY SUTURING

STAINLESS STEEL

$30.00

Catalog No. AJS 1000

Stanton's rectal speculum provides greater lateral space for operating—especially suturing. Easily introduced. Size of opening 1-5/8" wide, 1-1/8" high.

Wocher's

609 COLLEGE ST. CINCINNATI 2, OHIO

HEAD HALTER SET

complete as illustrated

adult	# 95A
youth	# 95B
child	# 95C

$9.00 per set

RAJOWALT CO.

ATWOOD, INDIANA

Sold only through Surgical Dealers

MULLER BINDER

Eliminates Adhesive Tape

Washable twilled fabric is made in range of sizes for male and female use after surgery. Both abdominal and chest types. Patented, hook-lock buckle makes it adjustable.

Write for Bulletin on Rib Belts, Clavicle Straps and Arm Slings

THE TEXAL COMPANY INC.

510 First Ave. N. · Minneapolis 3, Minn.

Colostomy and Ileostomy Patients

find MORE convenience and LONGER service with

PERRY APPLIANCES

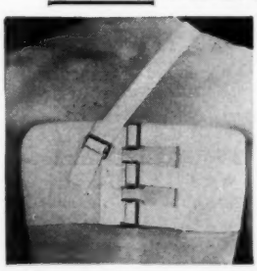
large variety of models and sizes CUPS, BAGS, PROTECTORS and IRRIGATORS, MANY FEATURES found ONLY in PERRY appliances. Write for folders showing complete line.

MURLE PERRY

3803 East Lake Street

Minneapolis 6, Minn.

ELASTIC, FRACTURED RIBS BELTS



(Ladies type not illustrated)

Order through your dealer, or order direct.

Sizes	Ladies	Male
Extra Large..	$3.00 ea.	$2.75 ea.
Large	$3.00 ea.	$2.50 ea.
Medium.....	$3.00 ea.	$2.25 ea.
Small	$3.00 ea.	$2.00 ea.

Less 10 % on orders of 12.

Write for our catalog of economically priced fracture equipment.

LITTLE MFG. CO., BOX, 202 WADESBORO, N.C.

THE BEAVER KNIFE

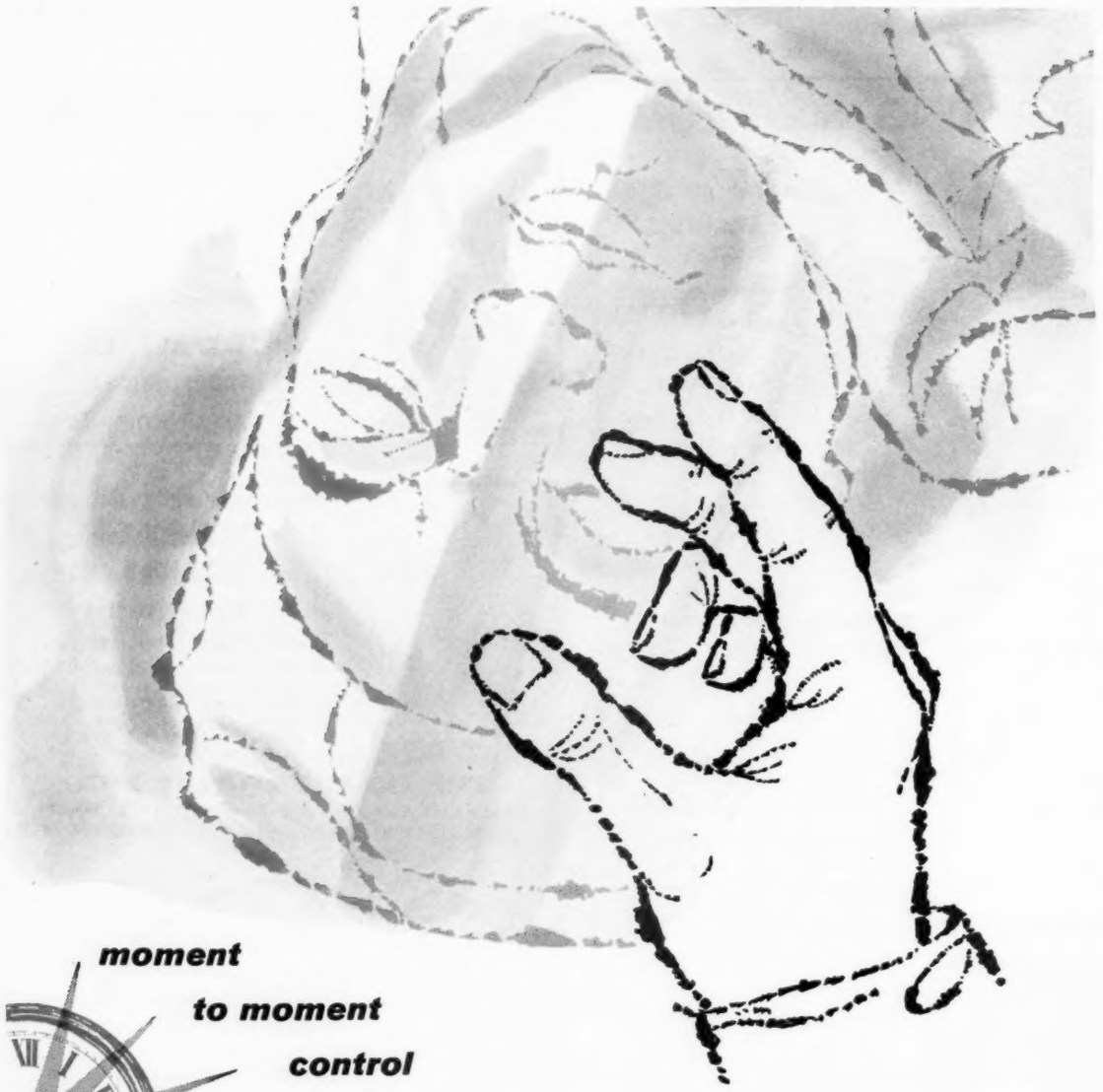
- Complete interchangeability
- Stainless Steel handles
- No weakening hole in blades
- Thick, sturdier

BLADES $1.50 doz.

HANDLES: #2 $3.00
#5 $2.50
#8 $2.00

SURGICAL KNIVES BY Rudolph Beaver

WALTHAM 54 • MASS.



moment

to moment

control

Pentothal® sodium

(Sterile Thiopental Sodium for Injection, Abbott)

In combination:

Quick response to the surgeon's needs
Reduced dosage of other agents
Compatibility with all other anesthetic agents

Alone: *Easily-controlled levels*
Rapid, smooth induction
Pleasant, swift recovery

Where PENTOTHAL is used frequently, enough solution for 24 to 48 hours may be prepared with assurance of stability. PENTOTHAL is now available in a 5-Gm. multiple-dose container (250-cc. size) and a 10-Gm. container (500-cc. size).

Abbott

511238

NOVEMBER 1955

THE American JOURNAL OF Surgery

ADVERTISERS INDEX

Abbott Laboratories..... 8, 60
American Hospital Supply Corp..... 4
Ames Company, Inc..... 1
Ayerst Laboratories..... 28
Bard-Parker Company, Inc..... 52
Rudolph Beaver..... 59
S. H. Camp & Company..... 55
Ciba Pharmaceutical Products, Inc....
23, 45, *Back Cover*
Cochrane Physicians' Supplies, Inc.... 55
Coles Electronic Corp..... 55
Cook County Grad. School of Medicine 50
Crescent Surgical Sales Co., Inc..... 51
Cutter Laboratories..... 6
Davis & Geck, Inc..... 29
J. A. Deknatel & Son, Inc..... 30
DePuy Manufacturing Co..... 55
Desitin Chemical Company..... 14
Dome Chemicals, Inc..... 42
Duke Laboratories, Inc..... 42
Ethicon Suture Laboratories, Inc.....
Insert Facing Page 8
C. B. Fleet Co., Inc..... 15
Gudebrod Bros. Silk Co., Inc..... 26
Hoffmann-LaRoche, Inc.....
Insert Facing Page 24
Homemakers' Products Corp..... 38
Identical Form, Inc..... 39
Johnson & Johnson.....16–17
Kling Photo Corp..... 57
Kremers-Urban Company..... 37
Lederle Laboratories.....39, 44
Liebel-Flarsheim Co..... 35
Eli Lilly & Co..... 32
Little Manufacturing Co., Inc..... 59
The S. E. Massengill Company....10–11, 24
Medical Aids, Inc..... 57
V. Mueller & Co..... 46
N.Y. Polyclinic Medical School & Hospital..... 50
Notes and Quotes.....54, 56, 58
Ortho Pharmaceutical Corporation.... 49
Orthopedic Frame Company..... 57
Parke Davis & Company..... 47
Murle Perry..... 59
Pfizer Laboratories, Div. of Chas. Pfizer & Co., Inc..... 20
George P. Pilling & Son Co..... 27
Propper Manufacturing Co..... 57
The Radium Emanation Corp.....55, 57
Rajowalt Co..... 59
Reed & Carnrick..... 25
Richards Mfg. Co., Inc..... 57
Riker Laboratories, Inc..... 12
Ritter Company, Inc..... 31
G. D. Searle & Co..... 33
Sharp & Dohme.....13, 21, 40
J. Sklar Mfg. Co., Inc..... 22
Smith, Kline & French Laboratories, Inc..... 18
Smith & Nephew, Inc..... 9
E. R. Squibb & Sons, Div. of Mathieson Chemical Co..... 34
The Surgeon's Mart.....55, 57, 59
The Texal Company, Inc..... 59
The Tower Company, Inc..... 55
The Upjohn Company..... 48
Wallace & Tiernan, Inc..... 55
Edward Weck & Co., Inc..... 43
Welch-Allyn..... 19
Max Wocher & Son Company..... 59
Winthrop-Stearns, Inc..... 2
Wyeth, Inc..... 36
Zimmer Manufacturing Co..... 57

you can produce
prompt, prolonged
surface anesthesia
with one application of

NUPERCAINAL®

Contains Nupercaine® (dibucaine CIBA), one of the most potent and long-acting anesthetics.

Effective in low concentration —sensitization rare (nonnarcotic —not related to cocaine or procaine).

Useful whenever surface anesthesia is required—burns, surgical dressings, hemorrhoids, abrasions, etc.

Ointment (dibucaine ointment CIBA), 1% Nupercaine in lanolin and petrolatum base.

Cream (dibucaine cream CIBA), 0.5% Nupercaine in water-soluble base.

Ophthalmic Ointment, 0.5% Nupercaine in white petrolatum, applicator-tip tubes.

MEDICAL HORIZONS TV Monday P.M. Sponsored by CIBA ABC-TV